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TEXTILE WORLD RECORD

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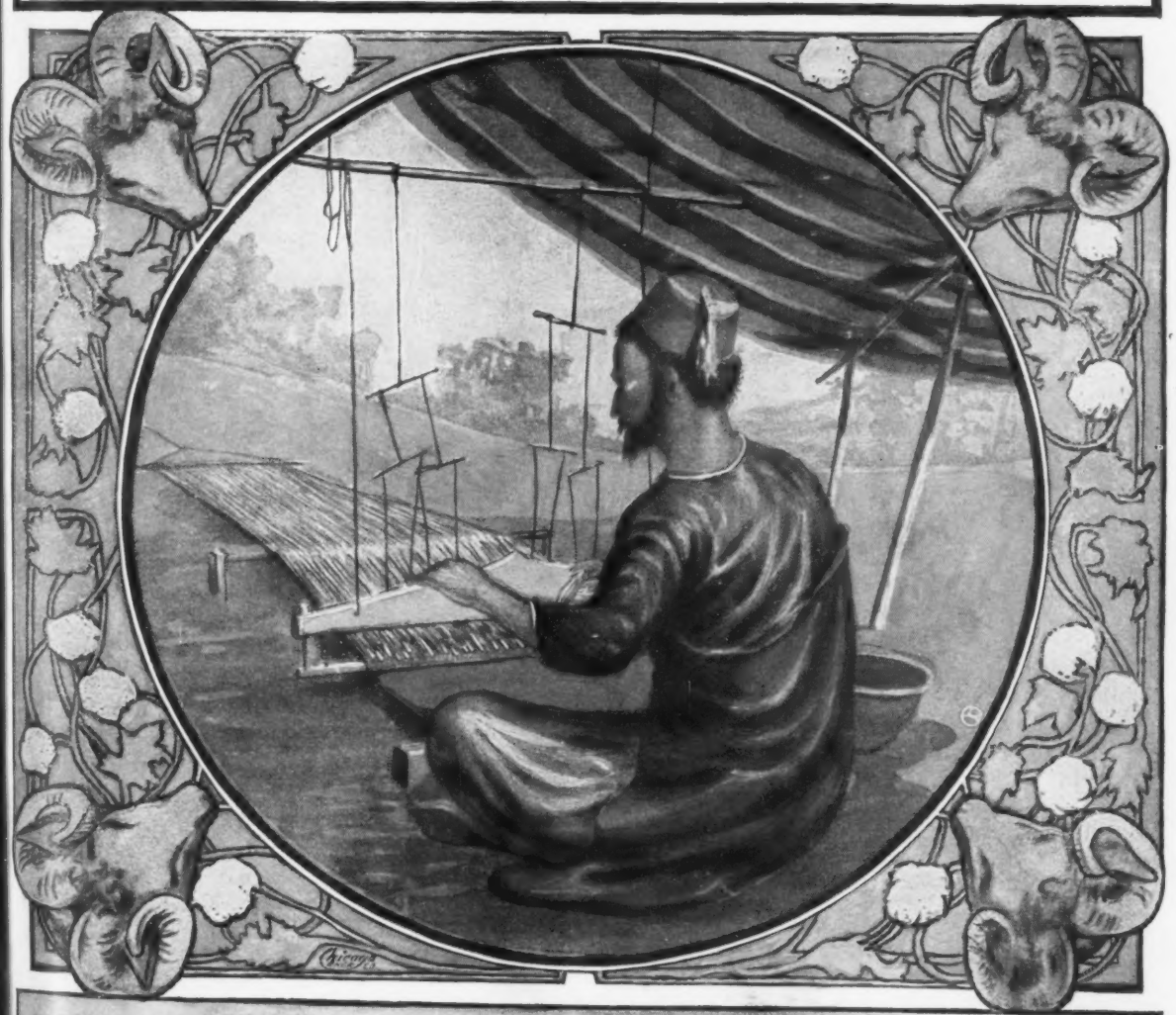

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Howard Building, Providence, R. I.

BUILDERS OF

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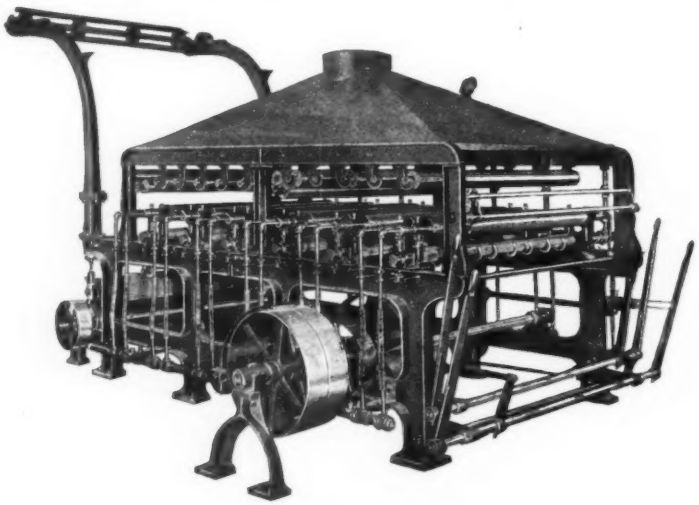
FOR

TEXTILE FABRICS AND WARPS

Plans and Estimates for Complete Plants



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FOR

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Bleaching Kiers with Patent Circulators

FOR

Raw Stock, Yarn, Woven and Knit Goods

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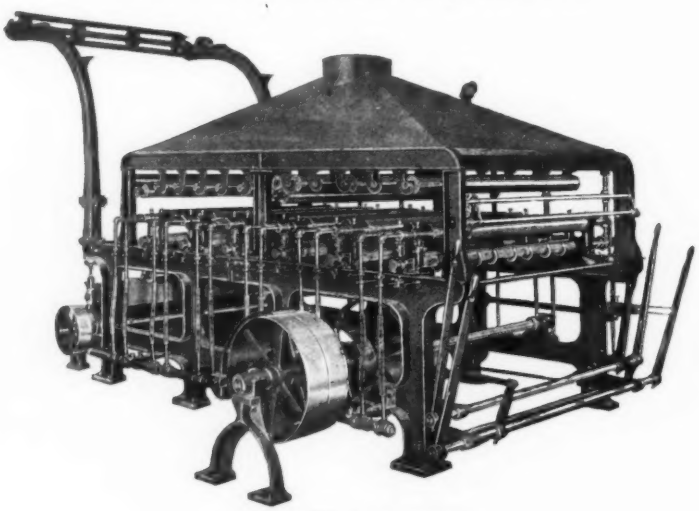

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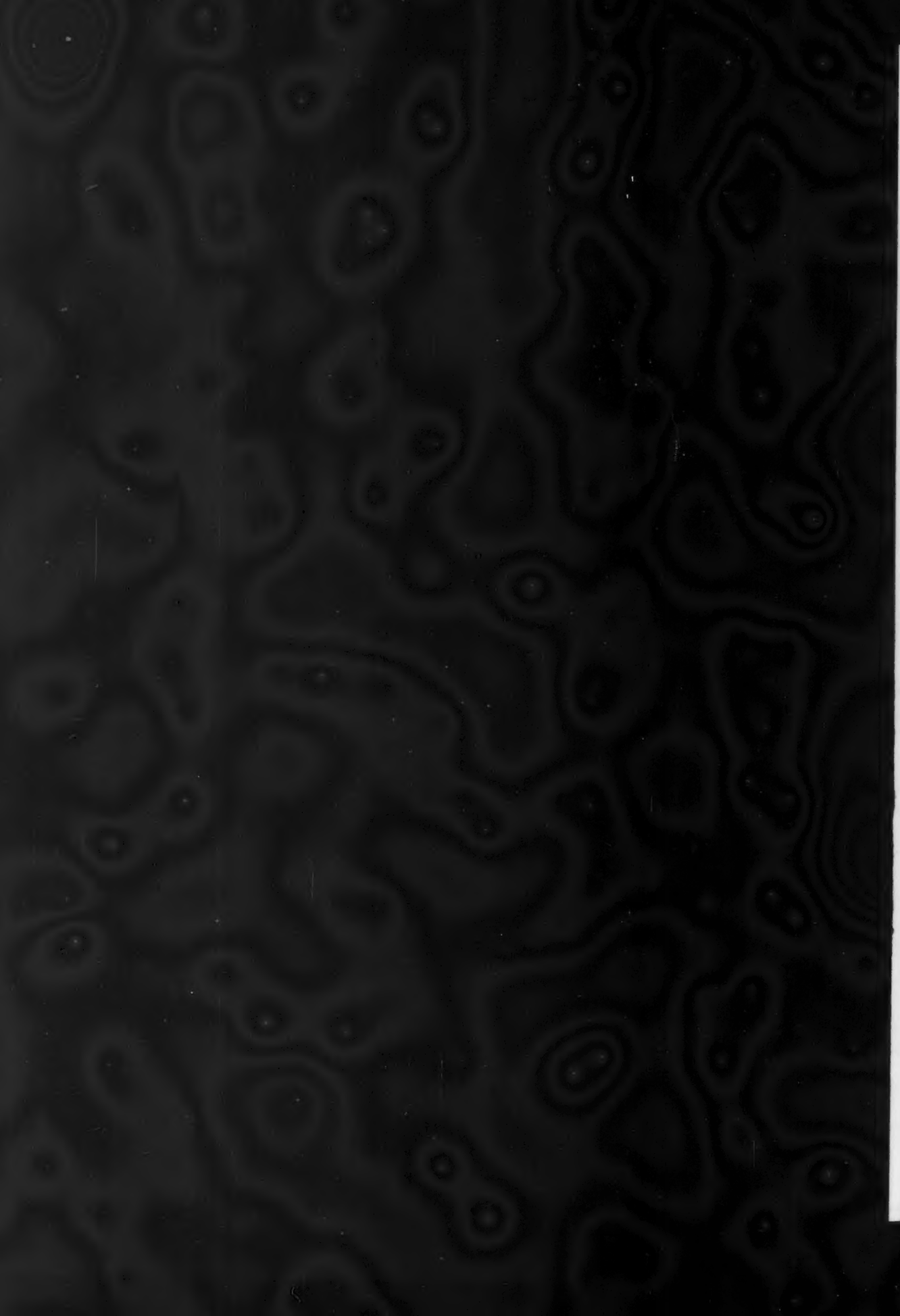

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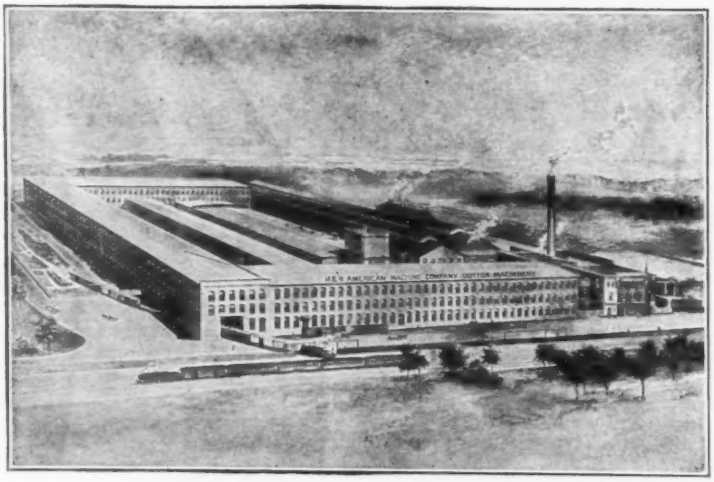
COTTON MACHINERY



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TEXTILE WORLD RECORD

JULY, 1913

Monthly Comment.

Getting Both the Goods and the Money

The "Manchester Guardian" in an unguarded moment recently allowed its fine-spun theory of free trade to come into direct conflict with the protectionist common sense of Abraham Lincoln. The result was the following amusing exhibition of subterfuge:

> A correspondent sends us, as a specimen of Tariff "Reform" propaganda, a postcard bearing, within an ornamental scroll, the following printed text:
>
> "I do not know much about the tariff, but I do know this much: when we buy goods abroad we get the goods, and the foreigner gets the money; when we buy goods made at home we get both the goods and the money."—Abraham Lincoln.

It seems that this modest yet comfortable exposition of the glorious gospel of something for nothing is enjoying quite a vogue amongst Tariff "Reformers" as a means of stimulating the cupidity of the unconverted; and, indeed, there is something that we find rather taking in its apparently artless simplicity. It reminds us at once of the illuminated text-cards which the children of a less exigent generation used to bring home as prizes from Sunday school, and of the once-popular conundrum about the shopkeeper who gave a hat and five shillings for a bad sovereign, which he changed with a neighboring tradesman, to whom he had subsequently to make restitution. There are some people who could never be convinced that the hatter's total loss was not two pounds, or at least the hat and twenty-five shillings, and some of these, or others equally bad at sums, may suspect that honest Abraham Lincoln discovered a way of ringing the changes by which buyers could "get both the goods and the money." If there are any such, we suggest, for their benefit, a simple method of testing the statement. Every purchase is also a sale, and therefore what Lincoln said of buying must apply equally well to selling. Thus transposed, the golden text would read:

> When we sell goods abroad we part with the goods and the foreigner parts with the money; when we sell goods at home we part with both the goods and the money.

The two statements contain exactly the same measure of literal truth and implied falsehood, the key to the falsehood being, of course, the play made with the word "we".

The "Guardian's error in the case of free trade and protection doubtless arises from a natural difficulty in making the word "we" when applied to commerce, extend beyond the borders of a commercially dependent island or even beyond the borders of the even more dependent part of that island, called Lancashire. Lincoln's "we" meant all of the people of the United States considered as a unit. If the "Guardian" can and will accept that comprehensive meaning of the word it will have taken a long stride toward becoming a tariff "reformer," as a British protectionist is called. So far as the intellectual exercise is concerned this should not be a difficult step for the "Guardian," as that journal in its consideration of other questions than free trade, exhibits the greatest familiarity with the broad meaning of the word "we." For example when protesting on May 24 against the Ulster opposition to home rule, the "Guardian" made "we" include an empire:

> We are in charge of an Empire, all of us.

A week later the "Guardian's" "we" stands for the Concert of Europe:

Liberals who ought to have known better have spoken as though we were a third member of the Dual Alliance between France and Russia. . . . It (the Concert) always sets the general interest against the will of the strong.

A week after that appeared, the "Guardian" found no difficulty in making its "we" include the United Kingdom and Ireland:

What we have to do, then, is to organize a force capable of defeating 70,000 invaders.

Lincoln used the word "we" to comprehend the general interest of all the people of the United States. His exposition of the doctrine of protection was not intended for a congested manufacturing district like Lancashire, whose industrial existence depends upon the free importation of raw material into Lancashire and the free importation of Lancashire products into other countries. It was intended for a country, which, like the United States, is in a high degree industrially independent. The existence of a strong protectionist party in Great Britain shows that Lincoln's view is gaining ground even there. The truth that Lincoln so clearly stated explains the growing discontent with British free trade in India, where with millions of people in a chronic state of idleness, misery and starvation, a vast amount of money is sent yearly to Lancashire for cotton goods. Under a protective tariff, which Great Britain will not allow, India might have both the goods and the money.

English and American Prices for Cotton Yarn

The comparison of English and American prices for cotton yarn of coarse and medium counts, which appeared in our May issue proved to be of great interest to the cotton trade as it showed differences in values which would be equalized if the House bill became a law. This month we are able to give a similar comparison of prices for the finer counts of yarn. In transmitting the foreign quotations our English correspondent says:

Quotations for the finer cotton yarns vary considerably according to the quality and in comparing prices it is necessary also to compare samples. Wishing to obtain a fairly representative statement of current prices I approached the Bolton Chamber of Commerce and received from the Secretary the quotations below which indicate the general range of values. Bolton is the center of the fine spinning industry and has about 120 mills with a capital value of probably $60,000,000. There are over eight million spindles and they are principally engaged on 50s to 100s twist and 90s to 130s filling.

The following table gives the English quotation mentioned by our correspondent, also with proposed Underwood duty added, and Boston quotations for corresponding counts and grades. The tariff rates are those reported to the Senate by the Finance Committee. English prices have been reduced to cents per pound:

	English Price		Fin. Com. Rate per cent.	English Total		American Price
Carded Warp:						
40s	29	31	15	33¼	35¾	33 cents
50s	31½	35	17½	37	41	38 "
60s	34	38	20	40¾	45½	44 "
70s	38	42	20	45½	50½	.....
Combed Warp:						
70s	43	48	22½	52¾	59¾	64 cents
80s	47	51	25	59¾	63¾	70 "
90s	50	55	25	62½	68¾	80 "
Carded Doubling Filling:						
40s	27	31	15	31	35¾	33 cents
50s	30	34	17½	35¼	40	38 "
60s	32	36	20	38½	43¼	48 "
70s	35	39	20	42	46¾	.....
80s	38	42	22½	46½	51½	.....
90s	41	45	22½	50¼	55¼	.....
Combed Doubling Filling:						
70s	40	45	22½	49	55¼	64 cents
80s	43	47	25	53¾	58¾	72 "
90s	46	51	25	57½	61¾	92 "

The following English quotations were obtained from another source for fine 2-ply yarn:

Combed Plain:				
2/80s	57½	25	72	
2/90s	63½	25	79½	
2/100s	69½	27½	88½	
Super White:				
2/120s	87½	27½	1.11	

Checking Emigration by a Tariff on Farm Products

At a recent meeting of the Austrian Association for the Protection of Forest and Field, which represents the agricultural interests of the country, strong resolutions were adopted in favor of a protective tariff on textile raw materials. The supporters of the resolutions encountered practically no opposition. They argued that the proposed tariff would encourage the cultivation of the land in small farms and check the emigration, which now threatens to depopulate large sections of Austria. The resolutions called for the following duties per pound on raw textiles: Cotton, 1.1 cents; flax and hemp straw, 1/10 cent; flax and hemp, broken, 14 cents; jute, 1.1 cents; unwashed wool, 1.1 cents; washed wool, 2.2 cents; scoured wool, 4.4 cents; silk cocoons and artificial silk, 7.3 cents; thrown silk, 10.9 cents; silk waste, 3.6 cents. The resolutions stated that no exceptions should be made, but that the protective rates should be imposed on all textile raw materials.

A Cotton Spinning Trust

The business depression and financial demoralization in the Italian cotton industry have at last resulted in the formation of a trust or cartel to be known as the Institute Cotoniero Italiana. The objects of the cartel are the enforcement of regulations for the sale of cotton goods and the control of the production of Italian cotton mills. According to the statistics of the International Cotton Federation there were 4,580,000 cotton spinning spindles in Italy on March 1, 1913. The Italian cartel controls 3,870,000 spindles or nearly seven-eighths of the total.

New Capital in the German Cotton Industry

The ebb and flow of trade in the textile industry abroad will be watched with more than the usual interest from this side of the Atlantic, as a depression there will under the new tariff have a more rapid and pronounced influence on the textile trade here. For the first three months of the present year the capital invested in new textile corporations and in additions to old ones in Germany showed a marked decrease as compared with the corresponding period in 1912. The figures for the first quarter for a series of years are as follows:

Year	New Capital
1907	$4,320,000
1908	2,407,200
1909	1,377,600
1910	4,142,400
1911	1,406,400
1912	2,781,200
1913	1,651,200

Damping Cotton Yarn

We have long been accustomed to complaints from Lancashire because of the practice of adding water to American, Indian and Egyptian cotton. It is but a short time since the European Cotton Federation held a Congress in Egypt, where those in attendance were thoroughly aroused by the sight of the Egyptian apparatus for spraying cotton for the market. Great was the indignation of the visitors and photographs were exhibited that had every appearance of a fire brigade at a conflagration. An explanatory note made it clear, however, that it was a view of the established custom of damping cotton at Alexandria. Thanks to the Federation the loading of Indian cotton with water is also known in every part of the cotton world, while American cotton growers and packers have borne their share of censure at the Federation's regular discussions of damp in cotton. So much has been said and so well said on this question as to create an impression that the European cotton trade and particularly the cotton spinners of Lancashire were the victims of a practice that they scorned to employ against their customers. Now, however, that impression has been dispelled, and the awakening is the result of a strike of cop packers at Oldham. We will let the "Manchester Guardian" tell how it happened:

THE "CONDITIONING" OF YARN

The cop-packers' strike has become a serious nuisance in the Lancashire trade, for though the work that the packers are called upon to do appears to be unimportant in itself it is necessary to efficient distribution, or, indeed, in some cases, to any distribution at all. Fortunately the strike is

confined to the Oldham area, which includes, we suppose, something between a quarter and a third of the Lancashire spindles; and within that area there are some firms outside the Federation which have made terms with the packers. It seems a pretty obvious thing when the goods are there and you cannot get them packed to take them unpacked, and this is what is being done in some cases, though in others the fear of disturbances has prevented it. It might have been expected that the spinner would have to make some small allowance to the manufacturer for failing to deliver the goods in proper form, but, as it happens, it is quite the other way. And here we come against one of the anomalies of the yarn trade; the spinners are said to want 5 per cent. extra if they deliver the yarn unpacked. The reason is that packing and "conditioning" go together, and conditioning is really damping, which involves adding some 5 per cent. to the weight of the yarn. It must not be supposed, however, that the cop-packing strike has revealed a nefarious practice, because everybody knew about the conditioning, and the question has been as to its limits. Yarn kept in stock gains in weight from the humidity of the atmosphere, and in some early stage of the cotton trade the spinner discovered that if he delivered fresh yarn to a clamorous customer he would make less profit on it than on what he had kept in stock. So the customer agreed that he should damp it to a reasonable extent, and has ever since been struggling against the abuses of this queer custom. The cop-packers get pretty good wages because they are, or should be, skilled conditioners, and amateur attempts to sprinkle or "deg" the yarn would hardly do, though possibly there is something of this too.

It appears that "everybody" in Lancashire knew about damping cotton yarn in that county, which fact, we are assured, prevents the practice from being nefarious. The cotton shippers of Egypt and India can and probably will make the same claim, because "everybody" in those countries knows about sprinkling raw cotton. It is only when the truth spreads beyond the boundaries of a country that damping cotton becomes nefarious. This distinction should be kept in mind when the purchase of English yarn is under consideration. Five per cent. of water will be an important aid to Lancashire spinners in cutting down the Underwood rates of 5 to 25 per cent. on cotton yarn. It would place the American and English spinners of the coarsest counts on a free trade basis. The striking of the cop-packers at Oldham serves the useful purpose of emphasizing the importance of established standards for moisture in textile materials.

The Philippine Tax on Exports

In our issues of January and February, 1913, we called attention to the effect of the provision in the Payne tariff refunding the tax on hemp from the Philippines. The facts disclosed in those articles, and particularly in the one by Harold M. Pitt, of Manila, showed plainly that the rebate operated to the benefit of the American importer and left the Philippine producer in the same position as if the tax had been retained by the government. This injustice is corrected by the Underwood tariff bill, which abolishes all export duties on Philippine products. Whatever may be said of other portions of the bill, there will be few to contend that the wiping out of these export duties is not entirely justifiable. The report of the majority of the Ways and Means Committee on the Underwood bills refers to this feature of the bill in these words:

Section 8 of an act to raise revenue for the Philippine Islands and for other purposes, approved August 5, 1909, is repealed in this paragraph. This section is a part of the revenue laws for the Philippine Islands, and provides for an export tax on certain articles the product of the islands. There is no civilized country in the world that today maintains an export tax on the productive energies of its people. Such tax is prohibited by the Constitution of the United States. We feel that in justice to the Philippine people this unjust tax that rests as a burden on their industrial growth should be repealed.

Fine Cotton Spinners as Cotton Planters

At the meeting of the Fine Cotton Spinners' and Doublers' Association at Manchester, Eng., last month, the chairman presented a financial report, which showed an increase of $442,260 in the year's profits as compared with the previous year. This is the English corporation that purchased a cotton plantation in Mississippi a few years ago. At the Manchester meeting H. Dixon, a director of the company, made the following report on the cotton growing branch of the business:

Mr. M'Connel and I have just spent three or four weeks on the American estate. When the estate was purchased we made careful inquiries with

regard to the question of floods in the Mississippi, and were told on the best authority that no floods had overflowed those lands since 1897. By some extraordinary circumstances within six months of that date America—a land of records—had another record. It was an unfortunate record for the Association, because the waters of the Mississippi overflowed several feet higher than was ever known, with the result that our property was flooded from one-third to a half from some two to ten feet deep. A great deal of damage was done to last year's cotton, and they were put back considerably, and a great deal of extra cost had to be incurred. Mr. M'Connel and I had hardly landed this year when we were told that there had been a cloudburst in Ohio, that the town of Dayton had been destroyed, and that another flood was coming down which promised to exceed even the abnormal record of the year before. Naturally our weeks were fraught with much anxiety, but I am glad to say that such care was exercised and experience brought to bear that we entirely escaped any damage.—(Hear, hear.) The American Government is now pushing a bill through the House of Representatives and afterwards the Senate for powers to spend 60 million dollars in raising and strengthening the levees down the Mississippi, so that there might be no further fear of danger from that source. Apart altogether from that water trouble we were very much satisfied with everything we saw in connection with the estate. With patience the estate would be brought up to the ideal with which the directors had set out, and I hope before long it will produce a cotton of very high intrinsic value, excellent length of staple, and strength, thoroughly suitable to the requirements of the Association.—(Hear, hear.)

—:—

Foreign Labor in the Textile Industry

The strike at Lawrence in January, 1912, came like a bolt from the blue and brought the textile trade of New England in contact with conditions which had developed so slowly that few even in the textile trade recognized their real character. The boom that followed the business depression of 1893-1898 created a demand for labor far beyond the home supply. The result was a great influx of immigrants from South Eastern Europe. In the ten or twelve years previous to 1912 these immigrants provided the necessary supply of labor to man the many new mills that were built and to fill the places made vacant in old mills. These new comers were ignorant of our language and institutions. Government to them meant oppression, and it was but natural that, instead of adopting themselves to the political and industrial conditions of this country they should welcome the leadership of men of their own race, who talked to them in their own language, understood their way of thinking and appealed to their racial ideals.

Although strangers to our institutions these immigrants are fundamentally suited for assimilation. They are Caucasians, and in natural disposition compare favorably with the American-born inhabitants of this country. Time and patience, however, is necessary to make them a harmonious part of our population. Because of the short time in which such a large number of these people came to this section of the country, a conflict between them and their employers was inevitable. When it came it was aggravated by serious mistakes and lack of tact on the part of the employers, which served to widen the gulf that naturally separated the foreign population from the American conditions by which they were surrounded. Both the foreign operatives and their American employers failed to understand each other. The trouble was aggravated by the victory of the strikers at Lawrence, and the resulting increase of wages in practically all the textile mills of New England.

Such a chain of circumstances was certain to cause a continuance of the industrial warfare of which Little Falls, Auburn, Paterson, Ipswich and Hopedale have supplied examples. Little Falls duplicated the mistakes made at Lawrence, but the strikes in the other places supply welcome evidence that the employers are learning how to meet the situation that their foreign employes have so suddenly created. Firmness is being combined with tact, and as a result the strikers are learning that there is a limit beyond which their demands cannot be made effective. Apart from the contest between employers and employes, the struggle has a political aspect, owing to the socialistic program of the Industrial Workers of the World. The abolition of private ownership in property is one of the features of their program. The idea deserves attention only because it is the rallying cry of misguided foreigners in this country at the present time. It has no practical aspect. Between the I. W. W. and the consummation of their socialistic program there stands the organized sentiment of the American people. There can be no compromise on this issue.

Subsidized Australian Tops

The subsidy, amounting to two cents per pound of tops, paid by the Australian Government for the past five years to combers of worsted tops has resulted in a rapid development of the top making industry in that Commonwealth. During the past year the production of tops in Australia amounted to 3,500,000 pounds, over 90 per cent. of which was exported to Japan. Estimating 200 pounds of tops to be equivalent to a bale of Australian wool, the exports of tops to Japan represents 16,000 bales of wool. In addition to this Japan in the same period imported 25,000 bales of Australian wool, making an equivalent total of 41,000 bales for the year. As a result of the heavy imports of subsidized tops from Australia, the top makers in Japan are complaining of what they call unfair competition and have asked the Japanese government to grant a bounty on Japanese tops equal to that paid by Australia.

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Austrian Competition in Cotton Yarn

The Balkan war caused a sudden and almost complete interruption of the exports of cotton yarn to Turkey and the Balkan countries. Austrian spinners were the principal sufferers and heavy stocks of yarn accumulated on their hands before they could restrict production. To relieve the congestion they have exported large quantities of yarn to Germany during the past six months. This in turn has raised a clamor among German spinners for higher protective duties on cotton yarn. The present rates are based on a sliding scale according to yarn count. Up to 11s, the duty is 5/8 cent per pound; 11s to 17s, 7/8 cent; 17s to 22s, 1.2 cents; 22s to 32s, 1.5 cents; 32s to 47s, 2 cents; 47s to 63s, 2.4 cents; 63s to 83s, 3 cents; 8s to 102s, 3.7 cents; above 102s, 4.4 cents. The Austrian mills spin coarse and medium counts.

American spinners have an interest in the situation, because of the prospect that a competitive tariff on cotton yarn will be in force here in the course of a few months. On 20s yarn the Underwood bill provides for a duty of 10 per cent., or 1.8 cents per pound on 18-cent yarn, as compared with 1.2 cents under the German tariff. On 40s yarn the Underwood rate is 15 per cent., or 4 cents per pound on 27-cent yarn, as compared with a German duty of 2 cents a pound. The restoration of peace in the Balkans will probably be followed by the resumption of Austrian exports of cotton yarn to the old market, but the temporary diversion of the production to Germany calls attention to the fact that American cotton yarn mills will be forced to meet new conditions of competition if the Underwood bill passes in its present form.

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Textile Machinery Exhibitors Meet

The annual meeting of the Textile Exhibitors' Association, Inc., was held at the Ferncroft Inn, Danvers, Mass., on Monday, June 9th. The trip was made from Boston in the early afternoon by automobiles, a large percentage of the members of the association being represented. The informal character of the meeting brought everyone together in a pleasant social way, which enabled plans to be freely discussed and views expressed by all.

The meeting was called to order shortly after arrival by the President, F. H. Bishop. After the regular routine business was disposed of the following officers were elected for the following year: President, F. H. Bishop of the Universal Winding Company; Vice-President, E. F. Hathaway, of the American Warp Drawing Machine Co.; Treasurer and Secretary, Chester I. Campbell, Manager of the Textile Exhibition. Directors: Charles F. Hutchins, of Crompton & Knowles Loom Works; L. W. Campbell, of the Woonsocket Machine & Press Co.; L. E. Tracy, of Lewis E. Tracey & Company; Geo. P. Erhard, of The Stafford Company; E. H. Rooney, of the Whitin Machine Works; C. A. Chase, of The General Electric Co.; F. H. Bishop, E. F. Hathaway, Chester I. Campbell.

Plans relative to the coming textile exposition which is to be held during the week of April 27th to May 2nd, 1914, were dis-

cussed. The association is planning to hold one of the most complete exhibitions of textile machinery, mill supplies, and general textile products ever exhibited under one roof. In addition to the textile exhibits, complete departments will be set aside for the cotton, woolen, hosiery and knit goods trade, and plans are also being made to again embody the annual power show of the New England Association of Commercial Engineers in this exposition.

Only the Exhibition Hall of the Mechanics Bldg., Boston, has heretofore been used to house the textile show, and although the date of the coming exhibition is nearly a year away, the interest already shown is so great that the association felt obliged to use the whole of Mechanics Bldg. This gives an additional area of 70,000 square feet, making a total of 125,000 square feet of exhibition space. The officers of the association feel sure that Mechanics Bldg. will be none too large to take care of all the manufacturers who will want to exhibit at this exposition All printed matter will be ready shortly.

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British Colonial Cotton

The annual report of the British Cotton Growing Association is devoted largely to giving thanks to the Government for granting new subsidies and for continuing the old ones in force and expressions of regret that the business of the Association continues to result in a financial deficiency. The report first says that

> The grateful thanks of the Association and of all who are interested in the great cotton manufacturing industry of this country are due to the Government for the action they have taken in guaranteeing the interest on a loan of £3,000,000 ($15,000,000) for the development of the Anglo-Egyptian Sudan, and also for the loan of £500,000 ($2,500,000) for the construction of railways, roads and harbor works in British East Africa and Uganda.

This is followed by thanks to the Government for

> The renewal for a further period of three years, dating from April 1, 1913, of the annual grant of £10,000 ($50,000) towards the cost of pioneering work in Northern and Southern Nigeria, the Gold Coast and Nyasaland.

The report acknowledges contributions of £4,680 ($23,400) from the North and North-East Lancashire Cotton Spinners' and Manufacturers' Associations, and of £2,144 ($10,720) from the cotton mill operatives, which bring the capital stock of the Cotton Growing Association up to £465,523 ($2,327,615). The remainder of the capital yet to be paid in, amounting to £34,477 ($172,385) has been pledged in part on condition that the total amount is raised. Fresh appeals are to be made to spinners, manufacturers and their operatives to provide the deficiency.

The business for 1912 shows a loss of £11,354 ($56,770), of which £3,963 ($19.815) is due to the abandonment of the work in Rhodesia. While this is discouraging, some consolation is extracted from the fact that the loss was greater in 1911, when it amounted to £25,183 ($125,915).

The amount of colonial cotton that has been marketed during the year shows a gratifying increase, the following being the figures for a series of years:

	Bales.	Value. £
1908	16,713	224,888
1909	20,028	225,078
1910	21,388	296,160
1911	27,673	373,583
1912	40,094	507,122

The amount of cotton grown in new fields in the British Empire during the past five years is given as follows:

	Bales.
1908	20,300
1909	28,100
1910	43,500
1911	60,800
1912	76,490

The report closes with the following bit of reasoning by analogy, which has been used for years to make the supporters of subsidies to colonial cotton and the contributors to the steadily vanishing capital of the Association believe that British colonial cotton can become something more than a negligible factor in the world's cotton supply:

> It is evident from these figures that the production of cotton grown under the auspices of this Association will very soon surpass 100,000 bales, and the council confidently claim that the rate of progress they can show is very much greater than was the case in the early days of cotton growing in the United States of America.

Adjusting Tariff Rates on Cotton Yarn and Cloth

The Underwood bill as reported to the Senate by the Finance Committee, provides, as did the House bill, for ad valorem rates based on the yarn count for cotton yarn and cloth. The accompanying charts show the Finance Committee's rates and the rates recommended to the Committee by Simeon B. Chase, of Fall River, in behalf of a number of cotton manufacturers who styled themselves the Independent Manufacturers of Cotton Yarns and Cloth of the New England States.

The Finance Committee's rates vary so little from those of the House bill that the two cannot be shown on the same chart. On gray carded yarn from 59s to 99s the House bill fixed the rate at 20 per cent. The Finance Committee recommends that the rates on gray carded yarn from 79s to 99s be raised to 22 1/2 per cent. Gray carded yarn above 199s is made dutiable under the Finance Committee's bill, at 20 per cent., instead of the House rate of 25 per cent. The Finance Committee made the rates 2 1/2 per cent. higher on yarn up to 199s, if combed, bleached, dyed, mercerized or colored.

The Finance Committee's rate on gray cotton cloths from 79s to 99s yarn was raised to 25 per cent., as compared with the House rate of 22 1/2 per cent. Cloth, if bleached, dyed, colored, stained, painted, printed, woven-figured or mercerized, is subject to an increase of 2 1/2 per cent. over gray cloth under the Finance Committee's bill.

The Chase schedule provided for an increase in the rates on both yarn and cloth by uniform steps of 2 1/2 per cent. each at intervals of ten numbers up to No. 109, and then a jump of 5 per cent. The changes in the House bill made by the Finance Committee bring the rates nearer to a uniform rate of increase, but, as the charts clearly show, there are four long steps of twenty yarn numbers each, and one high step of 5 per cent.

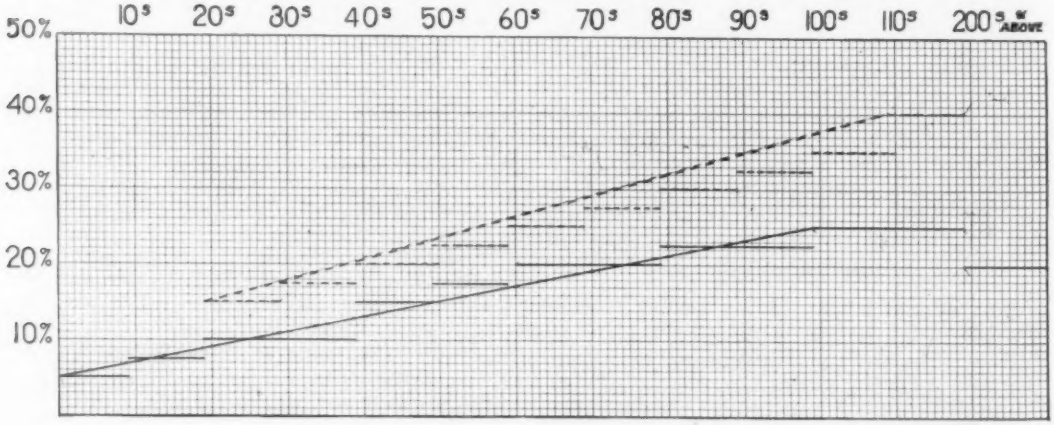

Fig. 1. The heavy horizontal lines indicate the rates on gray cotton yarn, as reported to the Senate by the Finance Committee. The dotted horizontal lines represent the Chase rates on gray cotton yarn, recommended by the Independent Cotton Manufacturers of New England. The diagonal lines illustrate the progressive method as applied to the Finance Committee and Chase rates.

THE STEP-LADDER SYSTEM UNJUSTIFIABLE

No good reason has been advanced for this step-ladder system of adjusting the rates to the yarn count, either for yarn or for cloth. Under the bill as reported to the Senate, cotton yarns, spun to Nos. 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38 or 39, are subject to one uniform rate of 10 per cent. ad valorem. If, however, the yarn is spun to No. 40, it at once becomes

dutiable at 15 per cent. In other words a pound of cotton yarn can be spun to any length from 16,800 yards to 32,760 yards and remain subject to the same duty, 10 per cent., but if it is spun 840 yards finer, that is, to 33,600 yards per pound, the duty is advanced 50 per cent.

The seven steps by which the Underwood rates on cotton yarn increase from 5 per cent. to 25 per cent., are all equally unjustifiable. There is no reason why the increase in rates should be bunched at these seven points. There are on the contrary good reasons why they should not be bunched at all, for this method creates serious irregularities in the tariff on different grades of yarn and cloth, and increases the temptation to fraudulent collusion between importers and customs officials. The remedy for this objectionable step-ladder system consists in making the rates increase uniformly as the yarn count increases.

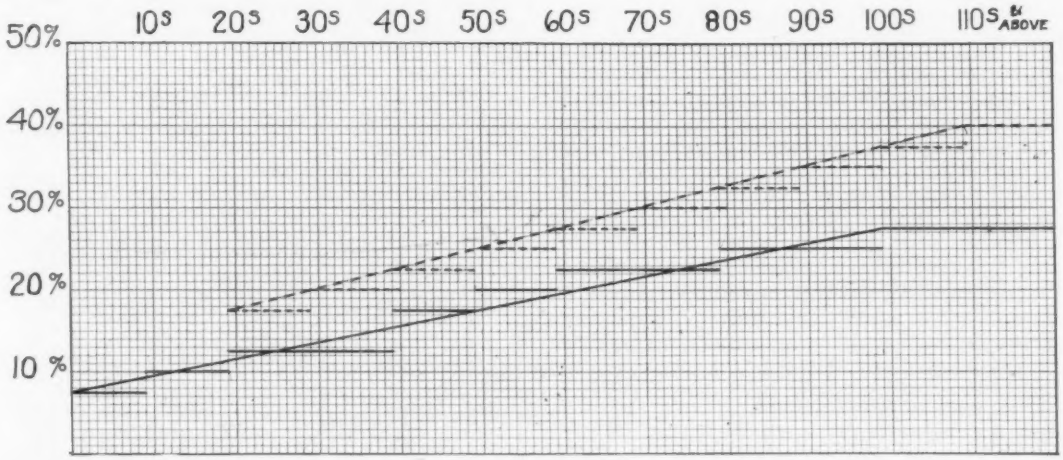

Fig. 2. The heavy horizontal lines indicate the rates on gray cotton cloth, as reported to the Senate by the Finance Committe. The dotted horizontal lines represent the Chase rates on gray cotton cloth, recommended by the Independent Cotton Manufacturers of New England. The diagonal lines illustrate the progressive method as applied to the Finance Committee and Chase rates.

THE REMEDY

The Finance Committee's schedule provides for an increase from 5 per cent. to 25 per cent. on yarn, and from 7 1/2 per cent. to 27 1/2 per cent. on cloth, as the yarn count increases from 1s to 100s. All that is necessary, therefore, in order to perfect this method of assessing the tariff, is to provide that the ad valorem rate shall be increased by one-fifth of one per cent. for every increase of one number in the yarn count. The Wilson bill of 1894 provided for this progressive method in the application of specific rates to cotton yarn, and it has been continued in every tariff bill enacted since that time. It is now in force, not only for cotton yarn, but also for flax, hemp and ramie thread and cord, and for spun silk. The silk schedule of the Underwood bill as reported to the Senate by the Finance Committee provides for this progressive method of increasing the tariff rate on spun silk with every increase of one number in the yarn count, as this extract from paragraph 320 shows:

> 320. Spun silk . . . if in singles, on all numbers up to and including number two hundred and fifteen, 45 cents per pound, and in addition thereto ten one-hundredths of 1 cent per number per pound; exceeding number two hundred and fifteen, 45 cents per pound, and in addition thereto fifteen one-hundredths of 1 cent per number per pound.

The step-ladder method of adjusting tariff rates to the yarn count is a serious defect in the plan of the Underwood cotton schedule, and should be remedied before the bill becomes a law.

THE UNDERWOOD TEXTILE SCHEDULES

The Underwood bill as revised by the Finance Committee of the Senate was submitted to the Democratic caucus for approval on June 20th. As approved by the caucus the textile schedules provide for the following rates:

SCHEDULE I—COTTON MANUFACTURES

Cotton yarn, carded, grey:

Nos. 1 to 9	5%
Exceeding Nos. 9 to 19	7½
Exceeding Nos. 19 to 39	10
Exceeding Nos. 39 to 49	15
Exceeding Nos. 49 to 59	17½
Exceeding Nos. 59 to 79	20
Exceeding Nos. 79 to 99	22½
Exceeding Nos. 99 to 199	25
Exceeding No. 199	20

Yarn not exceeding No. 199 if combed, bleached, dyed, mercerized, or colored, 2 1/2 per cent. additional.

Card laps, roping, sliver or roving, cotton waste and flocks, 5 per cent.

Spool thread, 15 per cent.

Cotton cloth, plain, grey:

Not exceeding No. 9	7½
Exceeding Nos. 9 to 19	10
Exceeding Nos. 19 to 39	12½
Exceeding Nos. 39 to 49	17½
Exceeding Nos. 49 to 59	20
Exceeding Nos. 59 to 79	22½
Exceeding Nos. 79 to 99	25
Exceeding No. 99	27½

If bleached, dyed, colored, stained, painted, printed, woven, figured, or mercerized, 2 1/2 per cent. additional.

Cloth composed of cotton and silk, of which cotton is the material of chief value, and tracing cloth, 30 per cent.

Cotton cloth, filled or coated, cotton oil cloth, window hollands, 25 per cent.

Waterproof cloth, of which cotton is the material of chief value, 25 per cent.

Handkerchiefs and mufflers, not hemmed, 25 per cent.; hemmed, 30 per cent.

Cotton clothing, 30 per cent.

Pile fabrics, wholly or in chief value of cotton or other vegetable fiber except flax, hemp or ramie, including manufactures of such fabrics, 40 per cent.

Curtains, table covers and articles of which cotton chenille is the material of chief value, tapestry and upholstery goods, 35 per cent.; all other jacquard manufactures of cotton, 30 per cent.

Hosiery, not especially provided for, 20 per cent.

Fashioned and seamless hosiery: Valued at not more than 70 cents per dozen pairs, 30 per cent.; valued at more than 70 cents per dozen pairs, 50 per cent.

Gloves, 45 per cent.

Underwear, 30 per cent.

Narrow fabrics, not exceeding 12 inches in width and not ornamented, 25 per cent., if embroidered, or made wholly or in part of lace, 35 per cent.

Towels, quilts, composed of two fabrics, blankets, wash cloths, sheets, pillow cases and terry cloth, 25 per cent.

Lace curtains with not more than 6 points to the inch in the warp, 35 per cent.; more than 6 points and not more than 8 points, 40 per cent.; counting 9 or more points to the inch, 45 per cent.

SCHEDULE J—FLAX, HEMP AND JUTE

Flax, tow of flax, hemp and tow of hemp, free.

Single yarn of jute not otherwise provided for, 20 per cent.

Cordage composed of istle, Tampico fiber, manila, sisal or sunn, 1/2 cent per pound.

Cordage made of hemp, 1 cent per pound.

Flax, hemp or ramie thread and twine made of yarn not finer than 5 lea, 20 per cent.; finer than 5 lea, 25 per cent.

Single yarn of flax, hemp or ramie, not finer than 8 lea, 12 per cent.; finer than 8 lea and not finer than 80 lea, 20 per cent.; finer than 80 lea, 10 per cent.

Ramie sliver, 15 per cent.

Flax, hemp and jute carpets, 30 per cent.

Shirt collars and cuffs, 30 per cent.

Pile fabrics of flax, hemp or ramie, 40 per cent.

Bags or sacks of single jute yarn not dyed, printed or bleached, 15 per cent.

SCHEDULE K—WOOL AND MANUFACTURES OF WOOL

Wool, mohair, by-products, rags and shoddy, free.

Combed wool or tops, 5 per cent.

Yarn, 20 per cent.

Cloths, knit fabrics, felts, not woven, women's and children's dress goods and coat linings, 35 per cent.

Pile fabrics made wholly or in chief value of wool, 40 per cent.

Hosiery, fashioned and seamless, if valued at not more than 70 cents per dozen pairs, 30 per cent.; valued at more than 70 cents per dozen pairs, 50 per cent.

Blankets and flannels, 25 per cent.

Clothing, 35 per cent.

Narrow fabrics, 35 per cent.

Aubusson, Axminster, moquette and chenille carpets, 35 per cent.

Saxony, Wilton and Tournay velvet carpets, 30 per cent.

Brussels carpets, 25 per cent.

Velvet and tapestry velvet carpets, 30 per cent.

Tapestry Brussels carpets, 20 per cent.

Treble ingrain carpets, 3 ply, and all-chain Venetian carpets, 20 per cent.

Wool Dutch and 2 ply ingrain carpets, 20 per cent.

Rugs, 50 per cent.

Cloth made of mohair and alpaca, 35 per cent.

Pile fabrics made wholly or partly of mohair and alpaca, 40 per cent.

SCHEDULE L—SILKS AND SILK GOODS

Carded or combed silk from cocoons or waste silk and noils, 30 cents per pound.

Spun silk or schappe silk, valued at exceeding not more than $1 a pound, whether single or ply, 30 cents per pound; valued at exceeding $1 per pound in the grey, if in singles, on all numbers up to and including 215, 45 cents per pound, and in addition 10/100 of one cent per number per pound.

Exceeding No. 215, 45 cents per pound and in addition 15/100 of one cent per number per pound.

In the grey, if 2 or more ply, not exceeding No. 215, 50 cents per pound, and in addition 10/100 of one cent per number per pound.

Exceeding No. 215, 50 cents per pound and in addition 15/100 of one cent per number per pound.

If colored, bleached or dyed, 10 cents per pound additional.

If on bobbins, cones, cops, spools or beams 10 cents per pound in addition to the above rates.

Thrown silk in the gum, if singles, 35 cents per pound; if tram, 55 cents per pound.

Organzine, 75 cents per pound.

If degummed or advanced in manufacture, 35 cents additional per pound.

Velvets or pile fabrics, not especially provided for, weighing less than 5 3/4 ounces per square yard, $1.25 per pound; weighing less than 5 3/4 ounces and not less than 4 ounces, or if all the filling is not cotton, $2.50 per pound. If all the filling is cotton, $1.75 per pound.

All the foregoing weighing less than 4 ounces per square yard, $3.25 per pound.

Plushes weighing not less than 9 1/2 ounces per square yard, $1 per pound; weighing less than 9 1/2 ounces, $2 per pound.

The duty on velvets and plush shall not be less than 50 per cent. ad valorem.

Handkerchiefs, not hemmed, 45 per cent.; if hemmed, 50 per cent.

Ribbons and narrow fabrics, 45 per cent

Clothing, 50 per cent.

THE MAINE WOOLEN MANUFACTURERS' ASSOCIATION

The annual meeting of this association was held at Pittsfield, Me., on June 13. There was a very interesting session which was devoted mainly to the election of officers and the discussion of the tariff situation. It was finally decided to present a brief on the revision of the tariff to the Maine delegation in the House of Representatives and Senate. A committee consisting of Gordon Dobson, Pittsfield; John Houston, Guilford, and Frank Phelps, Old Town, was appointed for this purpose. The following officers were reelected: President, Gordon Dobson, Pittsfield; vice-president, Arthur P. Abbott, Dexter; secretary and treasurer, John Houston, Guilford. Executive committee, Gordon Dobson (ex-officio), Pittsfield; Herbert Gray, Old Town; Wm. T. Haines, Waterville; George W. Walker, Warren; Ellis Jones, Newport; and Daniel A. Hurd, North Berwick.

THE STRENGTH OF JUTE YARNS

By T. WOODHOUSE and J. IRELAND

In consequence of the difficulties attending the spinning of jute fibers into yarn, the finished thread, except under special conditions, is probably as irregular in thickness as that of any other kind of yarn. This being so, it is natural to find that the breaking strength of such yarns varies considerably, and in consequence, it is essential that a number of tests of each yarn should be taken if even a fair average breaking value is desired. At the same time the better classes of yarns are, on the whole, satisfactory so far as regularity goes, and in these cases a smaller number of tests will suffice.

The actual breaking strain will vary according to the length submitted for testing, for it is obvious that the strength recorded is that of the weakest point in the yarn, and the longer the length tested, the greater is the chance of such length containing a weak spot. The question may naturally be asked, What is the proper length of yarn to be tested? If the yarn is to be used as warp, the greatest length which is likely to be subjected to a stress is that between the fell of the cloth and the yarn beam, and this length varies from about 30 to 48 inches. The yarn, however, receives a certain amount of support at the back rail, and also at the lease rods, if the latter are used. The distance from the lease rods to the fell of the cloth is rarely more than 20 inches, while the back rail may be about 10 inches from the rods. In order to obtain a reasonable test and relative values we have tested all the undermentioned with a uniform length of 24 inches between the grips, and in each case at least three different tests have been made. Where more than one row of figures appear for the same count and color of yarn, such rows represent yarns from different makers, and hence a more reliable average value results.

For the benefit of those who happen to be

unacquainted with the usual method of counting jute yarns, it may be mentioned that the weight in pounds of 14,400 yards (one spyndle) is the count of the yarn. If the count should be stated in leas per pound, i. e., the linen count, it may be quickly converted into pounds per spyndle or the jute count as follows:

48 cuts or leas ÷ lea count = pounds per spyndle or jute count.

Natural Jute Warp

Spyndles	Low	High	Av.
4	1.90	2.90	2.75
4	3.30	5.00	3.77
4	2.50	3.50	3.17
4	2.25	2.80	2.85
4	2.25	3.50	3.00
7	4.00	7.50	6.00
7.5	4.00	6.00	4.67
8	8.50	9.00	8.83
8	5.50	6.00	5.75
8	5.00	7.25	5.92
9	12.50	12.50	12.50
9	5.25	5.50	5.42
11	6.25	8.75	7.83
20	20.00	20.50	21.00
2/3.5	4.25	6.00	5.15
2/3.5	6.20	8.10	7.37
2/4	5.50	7.50	6.75
2/5	6.25	7.75	6.83
4/5.5	24.25	28.00	26.00
2/6	10.00	12.25	11.08
3/6	18.75	20.75	19.67
4/6	25.50	29.25	27.75
2/7	9.00	12.50	11.25
3/7	18.40	19.20	18.67
5/8	38.00	43.25	39.83
5/8	42.25	45.00	44.08
5/8	42.25	46.75	45.08
3/9	22.50	34.25	27.75
2/11	24.25	27.00	24.92
2/12	26.00	30.00	27.67
7/12	78.75	82.00	80.12
2/11	25.00	28.50	27.17
2/24	57.75	59.50	58.92
2/26	50.00	56.00	52.58
6/48	230.00	265.00	250.00

Natural Jute Weft

Spyndles	Low	High	Av.
4	3.00	3.75	3.50
5	3.50	5.00	4.25
5	4.40	5.00	4.63
6	3.50	5.50	4.50
6.5	3.00	4.25	3.75
7	3.75	6.00	5.00
7	3.75	6.25	5.00
7.5	4.25	5.25	4.75
8	6.00	8.50	7.67
8	3.75	6.25	5.17
8.5	5.50	7.50	6.50
9	5.50	7.50	6.33
9.5	6.00	8.75	6.92
10	6.50	7.25	6.92
16	8.25	10.75	9.50
18	5.25	8.50	6.58
19	8.75	12.00	9.92
20	10.00	12.25	11.00
20	13.50	15.50	14.42
24	16.00	17.50	16.92
24	7.50	13.75	10.25
27	21.75	24.00	23.17
28	19.50	21.50	20.67
36	21.25	23.00	22.33
48	28.75	40.75	32.92
55	22.00	24.50	23.00
60	124.00	139.00	133.00
90	31.00	42.50	35.50
96	30.00	46.75	40.58
96	30.50	46.50	37.33
96	43.50	49.50	45.50
120	44.00	52.50	47.83
180	44.25	80.50	59.92
200	54.00	73.00	66.50
200	61.00	66.50	63.80
200	128.00	142.00	134.00
400	215.00	255.00	231.67
400	80.00	136.00	108.00
2/5	7.75	9.50	8.83

Colored Jute Warp

Spyndles	Low	High	Av.
8	3.75	4.25	4.00
8	4.50	4.75	4.58
8	4.50	5.00	4.75
8	3.75	6.00	4.75
8	4.60	7.20	6.15
2/8	6.50	10.25	8.75
2/8	9.00	11.25	10.08
2/8	13.75	15.00	14.50
2/8	15.75	17.50	16.42
3/11	28.25	31.50	29.75
3/11	31.00	36.50	33.75
3/16	35.50	39.75	37.62
2/17	24.75	30.00	27.75

One-half Bleached Jute Weft

Spyndles	Low	High	Av.
5	1.50	3.50	2.50

Natural Jute Weft

Spyndles	Low	High	Av.
7	3.00	4.25	3.58
7	3.25	4.50	3.92
8	4.25	4.50	4.33
10	4.00	4.75	4.25
10	4.25	6.25	5.33
10	4.00	5.00	4.58
12	1.75	2.75	2.08
12	2.50	4.50	3.67
12	3.00	4.00	3.50
2/12	7.25	7.50	7.42
2/12	7.50	8.50	7.83
14	1.50	3.00	2.08
14	2.25	3.25	2.67
2/14	3.50	7.50	5.83
2/14	5.00	8.75	6.75

Colored Jute Weft

Spyndles	Low	High	Av.
14	9.00	10.50	9.50
16	11.00	12.50	11.75

18	15.75	16.25	16.00
20	12.25	20.50	15.08
24	12.75	14.00	13.17
28	17.75	23.00	21.00
36	26.75	31.50	29.25
48	28.75	35.00	30.92
60	27.50	35.00	30.42
2/5	8.50	10.25	9.33
6/16	52.00	84.00	64.67

Paper Weft Colored

Spyndles	Low	High	Av.
3.5	1.90	2.00	1.97
8.8	1.50	2.25	1.83
30.5	6.50	6.50	6.50

Paper Warp Colored

3/8.8	7.75	8.50	8.16
3/30.5	22.30	23.00	22.60

For the sake of comparing the strength of jute yarns with those of paper yarns, we give the breaking weights of all the paper yarns at present in my possession. The length between the grips was taken again at 24 inches and the counts of the yarn are stated in pounds per spyndle.

A rough value of the breaking weight of single jute yarns may be obtained by multiplying the pounds per spyndle by 0.75. This is, of course, only an approximation, for it must be remembered that the breaking weight is altered by the quality of the fiber, the number of turns per inch, and the efficiency of the preparing and spinning, as well as by other factors.

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WORLD'S RECORD PRODUCTION OF RAW SILK

By CONSUL CARL BAILEY HURST, Lyon, France

As will be seen from the following figures the production of raw silk throughout the world, as provisionally estimated and made public recently by the Union of the Raw Silk Merchants of Lyon, exceeds the total for 1911, by nearly 9 per cent. The raw silk output in 1912 is the greatest ever recorded and surpasses that of 1911 as far as now seen, by 4,784,025 pounds. The provisional figures are:

Western Europe:		
France		1,113,334
Italy		9,049,975
Spain		171,961
Austria-Hungary		665,796
Total		11,001,066
Levant and central Asia:		
Austria Turkey—		
Anatolia	936,965	
Syria and Cyprus	881,849	
Other Provinces	264,555	
European Turkey—Saloniki, Adrianople, etc.	573,202	
Balkans—Bulgaria, Servia, Roumania	319,670	
Greece and Crete	110,231	
Caucasus	870,826	
Turkestan and central Asia (exports)	617,294	
Persia (exports)	496,040	
Total		5,070,632
Extreme Orient:		
China—		
Exports from Shanghai (including tussahs, yarns, etc.)	14,109,583	
Exports from Canton (including shipments to Bombay and India)	4,971,423	
Japan—Exports from Yokohama	23,413,087	
East Indies—Exports from Bengal and Cashmere	352,740	
Indo-China—Exports from Saigon, Haifong, etc.	33,069	
Total		42,879,902
Grand total, 1912 (provisional)		58,951,600
1911 (corrected)		54,167,575

The exports from Canton for the season of 1911-12 embraced 11 instead of 12 months, in harmony with the decision of the committee of silk exporting firms to close, beginning with 1912, the silk seasons on May 1 instead of on June 1. This measure was adopted in order to have the exports coincide more closely than heretofore with the various annual crops.

[Provisional statistics of the world's raw silk production in 1911 appeared in Daily Consular and Trade Reports for June 10, 1912.]

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A simple kind of weaving seemed to have been practiced by prehistoric men at a very early stage of his development, and the first representation they possessed of an upright loom was dated 1600 years before.

A quaint mention of the value of a colonial woolen petticoat occurs in the journal of an eminent Quaker of Flushing, where he makes the entry under date of 1683: Martha Joanna's 30 weeks' schooling and what else, is paid for by a red petticoat to Elizabeth Cowperthwaite.

PURE TEXTILES AND THE LAW OF ADULTERATION IN ENGLAND

By Our Regular Correspondent

One point about the British Merchandise Marks Act deserves particular notice in the beginning. It is a law applying as fully to any one kind of goods as to another. The Act singles out no trade from the mass to provide it with special disabilities or privileges or to subject it to a code of conduct not prescribed for all the others. This characteristic distinguishes it vitally from any of the "pure textile" laws that are ever mooted and the distinction is important, not only as a matter of fairness between trade and trade, but also in the light of public polity. It is radically unsound policy to set up several codes where one will serve and special departures can only be wisely made on proof of special necessity. This thread of the argument will be resumed after the nature of the Merchandise Marks Act has been more fully described.

The full title is "An Act to consolidate and amend the Law relating to Fraudulent Marks on Merchandise," and it relates first to the forgery and imitation of private trade marks; and second to the application of false trade descriptions. It is this second object that is the pertinent one at present and the law is explicit upon the nature of the trade descriptions to which it applies. A "trade description" within the meaning of the Act is

> " . . . any description, statement or other indication, direct or indirect,
> (a) as to the number, quantity, measure, gauge or weight of any goods, or
> (b) as to the place or country in which any goods were made or produced, or
> (c) as to the mode of manufacturing or producing any goods, or
> (d) as to the material of which any goods are composed, or
> (e) as to any goods being the subject of an existing patent, privilege or copyright,
> and the use of any figure, word or mark which, according to the custom of the trade, is commonly taken to be an indication of any of the above matters, shall be deemed to be a trade description."

The measure obliges no man to put a mark or description upon his goods, but it aims to secure that all descriptions volunteered by the seller shall be correct ones and it provides punishment in cases of deceit. The penalties are variable to meet the case. Gross deceits, punished on indictment, lead to terms of imprisonment ranging up to two years, acompanied by hard labor and if need be by a fine. On summary conviction the penalty is four months and $100 for a first offence or six months and $250 for a second and in all cases there is forfeiture of the false goods. The consequences can be avoided by proving that all reasonable precautions had been taken, that on demand all information was furnished as to the persons from whom goods were obtained, or alternatively by proving innocence of all wrongful intention. In bad cases imprisonments have been inflicted on sellers of textile goods falsely described and fines of appreciable weight are visited on offenders regularly.

It will be seen that the text of the law takes account of the custom of the trade and that it is equally capable of correcting the draper who sells cotton as linen or the jeweler who passes off base metal as gold or paste as diamonds. There has not to be (sub-section d) any false trade description "as to the material of which any goods are composed." If a "horsehair" mattress proves to be goat hair, or a "silk" costume turns out to be chemical pulp, conviction is easy providing the evidence is complete. The purchaser is not limited to his own resources, for the Government will fight the case and at the instance of associations of manufacturers the Board of Trade is conducting prosecutions frequently.

The citation of a few cases chosen at haphazard will show how the law works in respect of the false description of component materials:

Jeweller, for selling silver trinkets of lower fineness than the invoice description. Fined.

Grocer, for labelling blended Indian and Ceylon tea as "Choice Ceylon." Fined.

Knitgoods Manufacturer, for labelling as "Natural Wool Underclothing" garments containing 59 per cent. of cotton. Fined.

Provision Merchants, for Labelling as "Pure Bladdered Lard" fat containing beef stearin. Fined.

Draper, for selling as "Colonial Silk" a costume made of artificial silk. Fined.

Tool Makers, for stamping "Hand Cut" on machine cut files. Fined.
Spectacle Dealer, for describing glass as "Pebble." Fined.

The list gives a short reminder that there are tricks in all trades and suggests that the natural corollary to a "pure textile" law would be a series of other laws, indefinitely numerous, applying individually to each trade in town.

It may reasonably be asked whether there are not in England any commodities at all of which the law takes an exceptional care, in excess of that shown towards goods in general. The answer is that England has special laws governing the sale of foods and drugs. The classification includes drinks, but excludes textiles. Foreign as the subject matter may seem to be, it is yet clear that such plausibility as can be mustered in favor of "pure textile" laws arises from the analogy—the false analogy—of foods and drugs. "Government steps in to say that the tea I buy shall not be artificially colored and that my canned meat shall not be uncleanly prepared. Why then should it not supervise the manufacture and sale of my clothing?" This familiar way of stating the case would be unanswerable were the two things the same, but it is manifest instantly that the case is not on all fours. All substances intended for the inside of the human body are on a different footing from those used exclusively for external application. With this point in view a short reference may be made to the nature of the British law against the adulteration of foodstuffs.

Acts against specific forms of adulteration had existed before, but not until 1860 was there a general Act against selling "any article of food or drink with which to the knowledge of such person any ingredient injurious to the health . . . has been mixed" and against selling as "pure or unadulterated any article of food which is adulterated." The law was much in consequence of the disclosures by a medical journal of the alarming extent to which irritant and deadly poisons were being mixed with food. The result was unsatisfactory and after the penalties had been increased without much effect a new measure was passed in 1875. This Act dispenses altogether with the use of the word "adulteration" and makes it a crime to sell "any article of food or any drug which is not of the nature, substance and quality of the article demanded." The similarity between this provision and those that have been quoted from the Merchandise Marks Act of 1887 will not fail to be observed.

The Food and Drugs Act goes further than the general law in obliging local authorities to appoint analysts and inspectors and in setting up standards, like the British Pharmacopoeia standard for drugs, the proportions of fat in milk and water in butter or of alcohol in neat spirits. But in foods and drugs there are certain allowances. It is no offence to add "any material or ingredient not injurious to health . . . because the same is required for the production or preparation thereof as an article of commerce, in a state fit for carrying or consumption and not fraudulently to increase the bulk, weight or measure . . . or conceal the inferior quality thereof." Neither is it an offence to sell food "unavoidably mixed with some extraneous matter in the process of collection or preparation."

These are not the only points to observe about the legislation in which England is at its strictest. It is provided that no person is to be deemed guilty if "he shall supply a notice by a label distinctively and legibly written or printed on or with the article or drug to the effect that the same is mixed." The grocer accordingly prints on his coffee-with-chicory packets a notice that the contents are mixed. The publican exhibits somewhere in his bar the intimation that while all his wines and spirits are of the best quality, yet in self-protection against the Food and Drugs Acts he does not guarantee their alcoholic strength. Then there remains a certain liberty to contract out of the Act, providing always that there is no deception. By insisting on warranties from his suppliers the retailer is able to protect himself and throw back the onus of defects of quality. By arrangement with the Customs the Board of Agriculture

receives the names of importers of adulterated or impoverished food and is thus helped to deal with trouble at its source. The laws and the machinery under the law are regarded as satisfactory and adulteration and deception have undoubtedly been diminished.

Recognizing the fundamental distinction between things intended for internal and external use all civilized countries have adopted special precautions in governing the trade in food. It is easy to appreciate the essential considerations involved. Obviously it is a greater wrong to supply infants with milk deficient in nutriment than to furnish them with clothing deficient in warmth. Two wrongs do not make a right, but the one is covert and the other overt. More clothing will make the child warm enough, but more skim-milk will not supply the materials necessary for his health and strength. The fact that a child is cold proclaims itself promptly, but the lack of nutriment may cause irreparable harm before discovery. It is infinitely more mischievous to supply the public with a daily dose of some thousandths of a grain of arsenic in its food than to introduce cent per cent of cotton into its woolen, its linen or its silk. The arsenic, the copper, the boron, the salicylates and so on are not distinguishable by touch, taste, sight or smell and an elaborate training and equipment is required to distinguish them in any sample of food. A novice may learn in two minutes as much as he needs for prservation against gross deceit in buying clothes.

If example has any meaning, the position simply is that good sense has discriminated between essentials and non-essentials, treating those matters in which common observation is powerless differently from those in which everyone can be his own guide. False analogies are one great standby of "pure textile" apostles and dense ignorance is another. The implicit assumption that goods technically pure are inevitably better value in use or exchange than goods technically mixed is a monument to this ignorance and worthy to rank with the egregious idea that a level comparison can be drawn between articles of food, drink and medicine and articles of clothing. The composition of textiles is not hard to discover and is much more easily verified than that of say metal goods. The damage done when fiber of one kind is substituted for another is not more, but less, than any comparable substitution made in goods of most other classes. Finally, although the consumer should, and ought to, get the quality he demands—"purity" as it is ordinarily understood is no infallible clue to serviceability. To secure that the customer shall get the goods he orders and pays for is the plain and almost the whole intention of the English Acts.

THE INTERNATIONAL COTTON CONGRESS

Over five hundred delegates, representing 80,000,000 spindles and 1,000,000 looms, attended the congress of the International Cotton Federation at Scheveningen, Holland, on June 9, the following countries being represented:

Austria, Belgium, Denmark, England, France, Germany, Holland, India, Italy, Japan, Norway, Portugal, Russia, Spain, Sweden, Switzerland and the United States.

The delegates were welcomed to Holland by the Dutch Minister of State. B. W. Ter Kuile delivered an address. Speaking to the American delegates, he said:

Your presence at the congress is a good omen for the cotton industry. In your conversations with the consumers of cotton from all parts of the world you will not fail to get the impression that you can continue to increase the growth of cotton without running any risk of finding that there were no buyers for their increased stocks. Providing they are not asked to pay for it "through the nose," spinners will take all the cotton that Americans and others could grow.

Sir C. W. Macara addressed the Congress and reviewed the history of the Federation. He made the following reference to the state of the world's cotton trade:

Though the state of trade in England and a few other countries has improved considerably, in others the conditions continues most unsatisfactory. If peace were reestablished in the Near East recovery from the temporary loss of important markets would follow. The more settled state of China would probably lead to a great increase in the demand for cotton goods in that country. There is also little doubt that with the

revision of tariffs in the United States of America, and a probable considerable reduction, the trade in cotton goods between European countries and America might be considerably increased

The second day's session was presided over by M. Berger, of France. Mr. Riley, a tradesmark expert, called attention to the losses that arise from the conflicting laws of different countries affecting trademarks. Mortiz Schanz, of Germany, presented a report on his visit to Egypt and the Soudan. A. S. Terrill, president of the United States Lumber and Cotton Co., made an address in which he expressed confidence as to the ability of the American cotton belt to meet the increasing requirements of cotton consumption. Prof. Brooks, of Mississippi, spoke on the baling of American cotton, calling attention to the need for reform. A letter from the American Cotton Manufacturers' Association was read inviting the Federation to attend the meeting of that body in the United States.

Herr Kuffler presented a report on the conference between representatives of the Federation and of the cotton exchanges of the world, which had been held at Liverpool, in regard to damp in cotton and other matters of dispute between importers and their customers. This was followed by an animated discussion in which the American delegates took a leading part.

George W. Neville, president of the New York Cotton Exchange, gave the Congress a shock by his comparison of Egyptian and American methods. He said in part:

American shippers have paid claims for moisture in cotton, but they have always understood that the moisture was on the surface of the bales, the allegation that it was internal damp being new to them. The practice of adding moisture, alleged against the growers and ginners in India and Egypt, he said, would, if followed in America, land the perpetrators in the penitentiary. I have unbounded faith in the honesty of the American planter. That there is damp in cotton, and that the quantity varied, I do not deny, but the variation is due to a heavy or a light rainfall, and to nothing else. He made the further point that American cotton passed through saw-gins, which would reduce it to waste if it were over damp.

The old system of baling is wasteful, and, I am glad to say, the new system is making headway. During the busy harvest season it is difficult to find warehouse room for the cotton, and the consequence is that much of it is exposed to the weather. The New York Exchange now proproposes to reduce the tare from 6 to 5 per cent., the latter amount being sufficient, and we hope that spinners would insist on making their purchases on that basis.

Harvie Jordan followed with an address in which he said:

In March the steamship agents of the South Atlantic and the Gulf ports, at a conference in New Orleans, said to the American exporter, "If you do not deliver to our ships cotton in good condition we will not only refuse to deliver to you a manifest that the cotton was in good condition, but we will say it was delivered in bad condition, and if it is not pressed to a minimum of 22 1/2 lbs. we will impose a penalty of 50 cents to a dollar." Why cannot you spinners say to the American exporter and the European importer, "If you do not deliver to me this cotton in good condition we will put upon you a penalty of 50 cents to a dollar?"

"Would he pay?" cried someone in the audience. "He would be obliged to pay," replied Mr. Jordan. The steamship agents would collect it. This question has stirred up the cotton trade as it was never stirred up before. They realize that proper packing at proper density means reduction in freight, reduction in country damage, which averages $2 a bale, or $30,000,000 a year, reduction in land and sea transportation, and reduction in insurance. I want to show you right now that the rate for cotton is 300 per cent. greater than the rate for corn, and the spinner pays it, as he, being the last buyer, has to meet the maximum charges.

Clarence Ousley, of Texas, advocated the establishment of a system by which the American planters would learn from month to month the amount of cotton in course of consumption, as the spinner learnt the amount of cotton coming into the market.

Arthur Kuffler, of Austria, closed the discussion. He said in part:

The International Federation gives authoritative figures annually, showing the amount of cotton in course of consumption. I admit that a better arrangement would be the issue of such figures month by month under Government supervision, but I am afraid a long time must elapse before any arrangement of that sort can come into operation.

We know that no artifiical damping of cotton is done by shippers, but we also know that when a man gets more for a bale of cotton when he leaves it out in the rain than he gets when he puts it into a warehouse, he has no great inducement to get it into a warehouse as quickly as possible. We want Mr. Neville and everybody else to find out what is the truth about damp in cotton. We think we have found it out.

At the closing session on Wednesday J. B. Tattersall, of England, stated that the only way to eradicate the evil of gambling from the cotton trade was by the wider cultivation

of cotton in countries in which climatic conditions were suitable.

Among the resolutions passed was the following:

> India being the only country in which an immediate and large expansion of cotton cultivation can be expected, this Congress, while expressing appreciation of the efforts already made, records its belief that adequate progress is impossible unless Indian Government allots annually more money to agriculture.

DISTINGUISHING LINEN AND COTTON IN THE SAME FABRIC

By ROBERT DANTZER

Translated from the French by the Editor of the Textile World Record.

It is sometimes necessary to distinguish the nature of threads in a bleached or dyed fabric and to determine whether the cloth is pure linen in both warp and filling, or mixed, that is, part linen and part cotton. The microscope affords the best means of settling the question, but few persons possess this apparatus, and many of those who have microscopes hesitate to use the instrument on account of lack of practice. In such

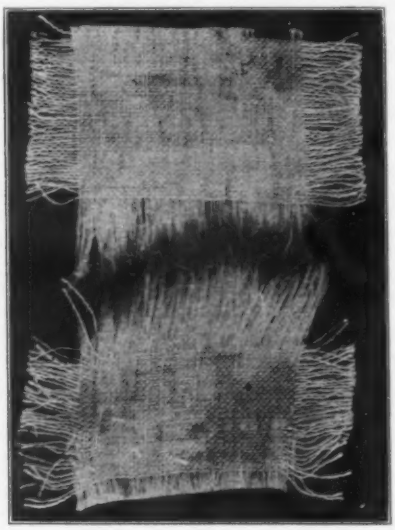

FIG. 1

cases it is possible to determine the nature of the threads by an examination of their physical and chemical characteristics. After some experience in this work one can distinguish very rapidly with the naked eye a pure linen from a mixed fabric. In case of doubt the following methods may be adopted:

1. Test by Tearing. The linen threads are much stronger than cotton and if it is as difficult to tear a fabric warp ways as it is filling ways, it is fairly certain that the cloth is pure linen. After a little practice in tearing cloths one can distinguish the difference

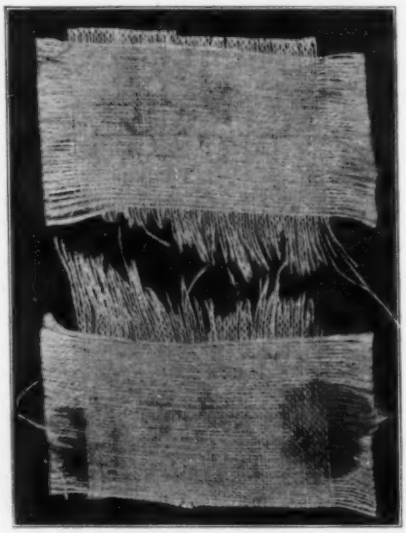

FIG. 2

between linen and cotton by the sound of the tear. Linen gives a dull sound, while the sound caused by tearing cotton is sharper. Figs. 1 and 2 show the torn sections of a mixed fabric made of cotton warp and linen filling. Fig. 1 shows the cloth torn filling ways, that is by breaking the linen. Fig. 2 shows the cotton warp torn apart. The difference in the appearance of the projecting threads is very perceptible. The broken ends of the linen threads have a pearly appearance, the fibers are irregular and lustrous, and the ends of the threads are untwisted, the fibers being very rigid, Fig. 1. The ends of the cotton threads show a cleaner break and the threads are dull in appearance, the fibers being curled instead of straight.

2. Test by Untwisting the Yarn. Many content themselves with drawing out several threads of warp and filling and untwisting

and drawing the thread apart so as to expose the fibers to view. The cotton fibers are shorter and tangled together, while the linen fibers are much longer, fairly parallel and more brilliant and less flexible.

3. Test by Ink. This process consists in dropping a small quantity of black ink on the sample. Fig. 3 shows the form of the ink spots on a pure linen fabric. Fig. 4 shows the form of the spots on a mixed fabric made of cotton and linen. Each spot is of approximately the same size as the black

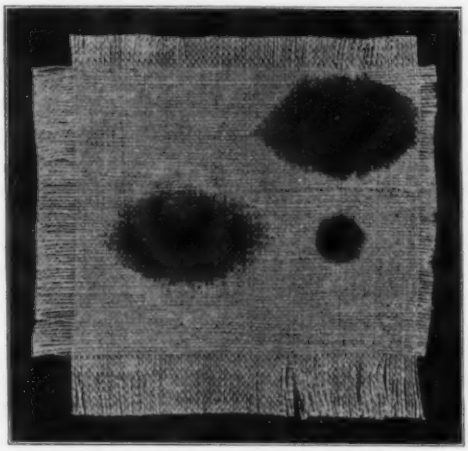

FIG. 3

circle at the lower right hand corner of Fig. 3. On the pure linen cloth the ink spreads in all directions from the original spot, forming an areola, the ink acting somewhat like a drop of oil on a sheet of paper. When the ink is dropped on the sample of mixed goods it spreads in the direction of the linen, which is more porous than the cotton. The composition of the ink has naturally a certain influence on the form of the spot, Figs. 3 and 4. The lower spot is made by ordinary ink, while the spot in the upper right hand corner is made with copying ink.

4. Test by Burning. Linen and cotton have each a cellulose base. Stockhardt has called attention to a difference between the two materials when they are burned. He claims that the ends of the linen threads after the flame has been extinguished are round and smooth, while the ends of the cotton threads separate more or less in the form of pincers. This distinction is very difficult to make and has no value for ordinary tests. Little is known of another test by burning, which, however, is very accurate. I discovered it several years ago and have had many occasions to prove its accuracy. This process consists in raveling the fabric to form a fringe half an inch long of warp and filling. The fringe is then set on fire and the flame acts differently according to the nature of the material. Fig. 5 is a pure linen fabric in which the filling fringe at the left has been burned, also the warp fringe at the top and the fringe at the right. It will be readily seen that the flame has burned the cloth both at the top and sides. Fig. 6 is a sample made of cotton warp and linen filling. This sample was raveled in the same way as Fig. 5 and both filling and warp fringes were ignited. The flame from the linen fringe attacked the cloth, while the cotton fringe burned down to the filling without attacking the fabric. This difference in the action of the fire is easy to understand. The cotton consists usually of 95 per cent.

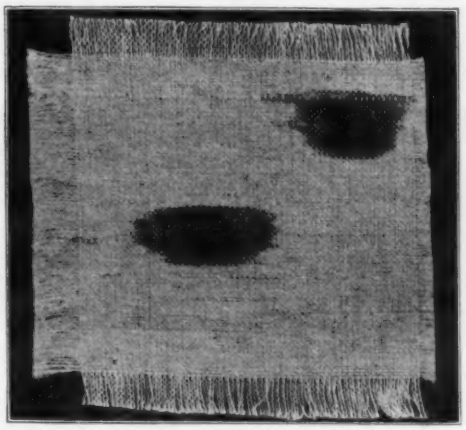

FIG. 4

of cellulose which burns without giving out enough heat to ignite the woven fabric. The linen yarn, on the other hand, is composed of only 75 per cent. of cellulose, the remainder being gummy and resinois matter which when ignited gives out a much greater quantity of heat and causes the combustion of the cloth.

5. Test by Oil. This method was discovered by Frankenstein. The cloth is first freed from the finishing material by boiling in a weak solution of carbonate of soda. After drying the sample is saturated with oil and placed on a plate with glass. When the air bulbs have disappeared the sample is covered with a smaller piece of glass, the oil is squeezed out, and the cloth is examined by holding it between the observer and the light. The linen fibers become transparent because of the thickness of the cell walls

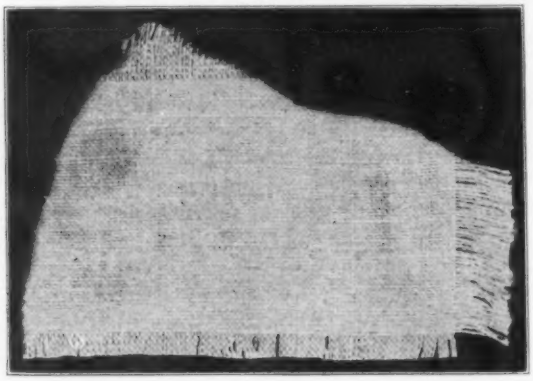

FIG. 5

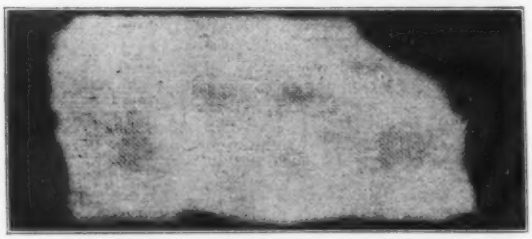

FIG. 6

which gives a refraction equal to that of the oil. By examining it between the light and the observer it appears clear, but when examined in the ordinary way it is opaque. Owing to the thickness of the cell walls and to the fact that the air is imprisoned in the cells, the cotton fiber is opaque when held before the light and appears clear in other positions.

6. Test by Sulphuric Acid. This chemical method was first recommended by Kindt and Lehnert. The cloth is freed from finishing materials and immersed for one or two minutes in concentrated sulphuric acid. After rinsing in water the sample is dried. The cotton is destroyed by this process while linen remains unaffected.

7. Test by Sulphate of Copper. This method, proposed by Astor, consists in removing the finishing material and then immersing the sample for ten minutes in a 10 per cent. solution of sulphate of copper. After rinsing in water, the sample is immersed in a 10 per cent. solution of yellow ferrocyanide. The linen acquires a copper colored shade, produced by the decomposition of the ferrocyanide, while the cotton remains nearly white. The contrast is made very plain after rinsing by immersing the sample in Canadian balsam, or in a very fatty oil.

8. Test by Methylene Blue. This method was discovered by H. Behrens and is comparatively simple. The sample of cloth is immersed in a hot solution of Methylene Blue, then rinsed in water. The rinsing removes the color from the cotton, while the linen remains blue. Bismark Brown or Safranine can also be used for this test. This method, however, is not suited for bleached fabrics where the fibers have been partially transferred into oxide cellulose.

9. Tests with Natural Dyestuffs. The fabric is immersed for 15 minutes in an alcoholic solution of natural dyeing materials, then dried between two sheets of blotting paper. When madder is used the linen acquires an orange shade, while the cotton becomes yellow. With cochineal the linen is violet and the cotton a clear red. Fuschine, proposed by Bottger, colored the linen, the color being removed from the cotton by rinsing. The test with Cyanine, mentioned by Herzog, colored the linen blue and the cotton remained unstained.

It may be well to add that all these chemical tests by the aid of dyestuffs not only require many different products, but considerable time, and moreover are far from conclusive. I am sending with this article two samples of cloth, one of linen and the other cotton and linen, both of which have been tested with Methylene Blue. As will be readily seen, the cotton has not been made

white by rinsing, but has simply become a lighter shade than the linen. The most practical tests are those with ink and by burning the fringes.

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HOW IT LOOKS IN AUSTRALIA

From Dalgety's Review, April, 1913

The proposal to place wool on the free list in the new U. S. A. tariff is fraught with the greatest possible importance to the Australian wool industry. The cabled advices came as a surprise to the trade, and were at first regarded with skepticism, but cables have since been received which report that there is every prospect of free wool. The all important question for wool growers is the probable effect of a free wool tariff on the Australian trade. The consensus of opinion is that it will mean a slackening of the demand for extra super sorts, such as frequently make sensational prices on American account, but a very big increase in the demand for average to good wools.

A glance at what actually took place during the past free wool period in U. S. A. is interesting, although the conditions have vastly changed, inasmuch as, despite a heavy tariff wall, the States have been unable to import something like 44 per cent. of the total wool used.

During the free wool period between the years 1894-7 there was a great expansion of trade between Bradford and the U. S. A. In 1894 the value of shipments was $8,198,363 and in 1895 it sprang to $27,688,125. In 1896 it fell to $13,656,492. In 1898 it fell again to a little over $4,860,000, and since then it has varied considerably. The average value of Bradford trade with the U. S. A. during the past three years has been just under $14,580,000 per annum. It must be remembered also that 1894-5 was a year of bumper production, and the wool imports unto Europe and America during 1895 reached 2,001,000 bales of Australasian wool. The two following years the imports were 1,800,000 bales. It was not until 12 years after 1895 that the two million bale limit was again reached.

The free wool period in America followed the McKinley tariff, which was imposed in 1890 and extended to 1894. The tariff was a high one, and wool prices were at that time very low. The free wool regime was under what was known as the Wilson bill. The result of free wool was only a slight increase in carpet wools (which had never been grown much in America). Of the combing wools, mostly English, three or four times as much was imported, and of the clothing wools—the wools which competed most with the domestic clip—the imports rose to 140,000,000 pounds for the three years of free wool. The U. S. A. wool growers demanded that a duty should be reimposed. An impartial authority, Prof. Clapham, of Cambridge, in summarizing the free wool period results, says:

"The flocks had fallen heavily in the country as a whole during the three years, but they had actually grown in the Rocky Mountain States. What the free wool system did was to give practically a deathblow to all attempts to grow finer wool on a large scale in those parts of America which had not the special conditions of the Rocky Mountains."

The Dingley tariff of 1897, reimposed the old rates on combing and clothing wools, and they were retained in the Payne-Aldrich tariff of 1909.

The Sydney shipments of wool to the United States showed a big expansion during the free wool period. They sprang from 6,954 bales in 1894-5 to 17,626 bales in 1895-6, 14,232 bales in 1896-7, and 11,649 bales in 1897-8. In 1898-9 they fell to 2,562 bales. For the first half dozen years after the restoration of the duties our shipments ranged from 1883 to 6,617 bales, but during the past eight years they have fluctuated from 6,000 to 27,000 bales.

During the first year of the Wilson tariff 117 1/2 million pounds of class one, or colonial wool, were impored, an appreciable portion of which was scoured. The nearest approach since was 112 million pounds, an amount greatly in excess of the average. The import of class two (luster or English wools, including mohair and alpaca), was 12 1/2 million pounds, and this has been greatly exceeded since, due to fashion changes and the rise of mohair manufacture

in America. Class three (carpet or coarse wools) were imported to the extent of 108 million pounds in 1896, whereas 110 million pounds were imported in 1910.

There has been a huge growth in the consumptive power of the American mills since the free wool era, so that the totals given are at best but a rough guide to the present possibilities under free wool. One effect will be that wools now beyond reach, such as scoured and skin wools, will be included in America's purchases.

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THE STRENGTH OF FIBERS

The Bureau of Plant Industry at Washington has recently issued a report on an extensive series of tests made by Lyster H. Dewey, Botanist, and his assistant, Marie Goodloe, to determine the strength of textile fibers. Over one thousand samples of cotton fibers were tested, the results being summarized as follows:

Tensile strength is the most important character of fibers used in making yarn, twine, thread and woven goods. This one character must be combined with sufficient flexibility, fineness, length, uniformity of diameter, and smoothness to be suitable for spinning, but strength must be regarded as a prime factor.

In nearly all textile mills tests are made of yarns, twines, ropes, and also of woven goods made up of yarns, but very little has been done heretofore to actually measure the strength of individual raw fibers. A list of the "strongest fiber known" would fill several pages, and in the absence of accurate measurements superlative claims are reasonably safe from authoritative contradiction.

A paper, 2, on the methods of testing fibers and giving results of numerous tests of tensile strength of single fibers was published in Java in 1908, but this excellent treatise in the Dutch language is little known in this country.

Many different kinds of machines have been devised for testing yarns, and some of these which are especially accurate in a low range are suitable for single fibers. A machine for testing cotton must be accurate in a range from 30.8 to 308.6 grains and one for testing long, hard fibers from 1,543 to 154,300 grains.

STRENGTH OF COTTON FIBERS

More than a thousand samples of cotton fibers have been tested in the Office of Fiber Investigations. The machine used in making these tests is based on the principle of balances, with a sliding brass bar instead of weights. The operator moves the bar steadily and without any jar by means of a thumbscrew which turns a ratchet wheel touching teeth on the bar. A single fiber picked up by the double forceps is placed in the jaws of the machine, the rounded faces of which, pressed together with springs, hold the fiber firmly but do not cut it. The weight is added by turning the thumbscrew with a uniform motion, and the breaking strain is read on the dial in tenths of grams. Twenty fibers are thus broken, one at a time. The breaking strain of each is recorded, showing the variation, and the average is determined as the tensile strength of the sample.

While there is much variation in every sample, it has been found by numerous trials that the average breaking strain of 20 fibers is approximately the same as that of a larger number. This is especially true of seed cotton, where it is possible to take one fiber from each of 20 different seeds. Furthermore, it is found that the fibers taken from midway on the side of the seed are more uniform than those at either end. Those at the pointed end are most variable.

The results from a large number of tests of samples from nearly all of the prominent varieties in the seven different groups of American Upland cotton, and also Sea Island and Egyptian cottons, are condensed in Table I.

TABLE I.—TENSILE STRENGTH OF COTTON FIBERS

Variety of cotton	High	Low	Av.
	grains		
American Upland (Gossypium hirsutum):			
Big-Boll Stormproof group	139	80	103
Big-Boll group	179	71	102
Cluster group	119	79	92
Semicluster group	109	72	90
Peterkin group	92	77	88
Early group	106	80	87
Long-staple group	86	54	73
Sea Island (Gossypium barbadense)	117	72	95
Egyptian (Gossypium barbadense):			
From Arizona and California	123	8[illegible]	103

The highest and lowest figures given in the foregoing table are the averages for 20 fibers, not the highest and lowest breaking strain of single fibers. The tensile strength of single fibers of American Upland cotton is generally in inverse ratio to their length, though the longer staples make stronger yarns. The strength is in more direct ratio to the diameter. The accurate measurement of the diameters of the twisted, ribbon-like cotton fibers presents such difficulties and requires so much time that it is not included in all tests. Measurements by means of a microscope with an eyepiece micrometer have been made of more than 100 samples. A summary of these measurements is shown in Table II:

TABLE II.—DIAMETERS OF COTTON FIBERS

Variety of cotton	Max	Min	Av.
	per inch		
American Upland (short staple)	730	812	796
Sea Island	903	1,168	1,044
Egyptian (American grown)	903	1,380	1,090

1 micron = 0.001 millimeter, or nearly 0.00004 in.

A series of tests has also been made to determine the pull necessary to detach the fiber from

the seed. In American Upland varieties this ranges from 29.0 to 35.5 grains, and in Sea Island from 27.0 to 30.1 grains.

STRENGTH OF LONG FIBERS

The long fibers constitute two natural groups: (1) Soft fibers, or bast fibers, such as flax, hemp, jute and ramie; (2) hard fibers, such as abaca (Manila hemp), henequen, sisal, and phormium (New Zealand hemp). The strands of the soft fibers vary greatly in thickness and they usually cling together in such a manner as to make it practically impossible to select single strands for comparison. The hard fibers, however, present single strands sufficiently uniform and free from other strands to be selected for breaking, but they are not uniform enough to be directly compared. A coarse, hard fiber may break at a higher tensile strain than a finer one, yet the fine one may be much stronger when compared with equal bulk or weight for weight.

In testing hard fibers the following method is pursued:

Twenty fibers are selected from the sample and their length measured, after which they are weighed and the total weight is divided by the total length, giving the average weight per yard. They are then broken, one at a time, in the testing machine.

The results of numerous tests of some of the principal hard fibers are given in Table III.

TABLE III.—WEIGHT AND BREAKING STRAIN OF HARD FIBERS

Fiber	The weight per yard	Breaking strain per strand	Breaking length in yards
	Grains	*Grains*	
Abacá (Manila hemp), Musa textilis:			
Highest	.567	46.6	82.2
Lowest	.962	31.0	32.2
Average	.772	34.8	45 0
Henequen (Yucatan sisal), Agave fourcroydes	.765	16.7	21.8
Sisal (Hawaii and East Africa), Agave sisalana	.616	22.7	38.4
Cantala (Manila maguey), Agave cantala	.429	9.6	22.3
Phormium (New Zealand hemp), Phormium tenax	.659	18.8	28 5
Zapupe Vincent (Agave lespinassei)	.722	21.5	29.7
Cabuya (from Costa Rica), Furcraraea cabuya	.574	20.0	32.2

[The breaking length is the length of fibers that will break by its own weight.]

Several different grades of abaca are recognized in the market, the differences being due chiefly to greater or less care in cleaning the fiber and therefore this fiber presents a wide variation in weight per yard and in strength. The highest and lowest figures given in the foregoing table do not represent the extreme limits. Henequen and sisal cleaned by machinery are more uniform.

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Cotton was of so little importance in England previous to the nineteenth century it was regarded in 1736 as an ornamental plant. At the accession of George 3d in 1760 the whole importation did not amount to more than 200,000 pounds.

WAGES IN BOMBAY

A belated report has just been published upon the wages in Bombay Presidency during the month of August, 1911. It is nevertheless interesting, as illustrating the great diversity of rates of pay and of hours of work among different trades and in different places. In Bombay, unskilled labor, in which are included the millhands, is paid monthly from Rs. 10 to 18 ($3.50 to $6.30); and day laborers from 6 to 12 annas (12 to 24 cents), according to class, and more rarely Rs. 1-2 (18 cents). Other towns, except those in Sind, show lower rates than those of Bombay. During the past five years a rise of at least 25 per cent. has been observed in the rate of wages, but little improvement has taken place in working ability among skilled workers or capacity for organization. Among skilled workers, blacksmiths generally work on piecework, while others are paid by the day or month. A fitter may earn from Rs. 65 to 220 ($23.75 to $77.00) a month in railway workshops. In Bombay, firemen earn from Rs. 15 to 60 ($5.35 to $21.00); carpenters from Rs. 15 to 75 ($5.35 to $26.25); the pay of masons varies least, and the hours of skilled labor varies from 7 to 12 hours per day. Millhands are now limited to 12 hours, and other laborers from 8 to 10. From time immemorial, the custom of payment in kind for service rendered has prevailed. Twenty years ago the village artisan saw very little money. The smith, carpenter and weaver were mostly paid in produce, but the present report shows the gradual increase of money payments. Wages in money vary from 2 to 6 annas (4 to 12 cents) per day. Farm ser-

vants are engaged usually by the year, and receive Rs. 20 to 50 ($7.00 to $17.50) per annum with free board and lodging, also clothing of the value of Rs. 4 to 12 ($1.40 to $4.20); when paid in cash the wage is Rs. 60 to 100 ($21.00 to $35.00) per annum.

All authorities agree that during the last ten years, the rates of pay have increased 25 per cent. The unskilled laborer is more independent and less amenable to control. The hours of labor have decreased, and laborers are very unpunctual. On Government farms where regular hours are kept, higher wages have to be given. What is worse, the quality of work done by artisans and farm laborers, from whom skill is required, is stated to be much inferior to what it was ten years ago, and land is less well cultivated than it previously was. The prevalence of plague, the multiplication of factors, the extensive railway docks, and the hydro-electric works, and the rise in the cost of foodstuffs are believed to be the chief causes of this falling off.—Indian Textile Journal.

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THE SOUTHERN TEXTILE ASSOCIATION

This organization held its sixth annual meeting at the Isle of Palms, S. C. The meeting was called to order by vice-President, Z. H. Mangum, of Gibsonville, N. C. The address of welcome was delivered by Mayor John P. Grace, of Charleston, and the response made by H. P. Meikleham, agent of the Massachusetts Mills, Lindale, Ga. The election of officers resulted as follows: President, T. B. Wallace, Greenville, S. C.; vice-presidents, C. H. Goodroe, Yazoo, Miss.: M. E. Stevens, La Grange, Ga.; E. E. Bowen, Greer, S. C.; W. H. Hardeman, Newberry, S. C.; secretary, A. B. Carter, Athens, Ga.; members of Board of Governors, J. Y. Jones, Newberry, S. C.; John W. Clark, West Durham, N. C.; M. B. Clisby, Newberry, S. C.; C. P. Thompson, Trion, Ga.; J. W. Kelly, Pelzer, S. C., and D. R. Harriman, Jr., Greer, S. C.

David Clark, of Charlotte, N. C., read a paper on "Increasing the Efficiency of the Operative."

Charles Mills, consulting expert of the Saco-Lowell Shops, Boston, Mass., read a paper on "Evolution of the Cotton Card."

The following papers were also read:

VALUE OF MODERN MIXING METHODS IN THE WASTE REWORKING PLANT

By S. K. OLIVER, Columbia, S. C.

The actual point at which it will become necessary to combine the two or three grades of stock or "mixing" which has been run through the pickers, will depend upon the machinery equipment; but, if possible, the stocks should be carded separately unless the type of card used will not permit of carding the lowest grade stock alone.

By rearrangement of their working systems in this way, many who have been operating old machinery with picker room mixes, may materially better the cleanliness of the product pending the purchase of suitable equipment; or, if they do not wish to improve the character of the product, they may cut down or discontinue the amount of cotton which they may previously have used. They may also find it possible to utilize some grades of dirty waste which heretofore it had been their practice to discard.

Whether by increased price for a cleaner product or by ability to utilize grades of lower average price, it is conservative to estimate a saving in excess of one-half to one cent a pound by combining grades at the proper time, without noticeable increase in labor cost or decrease in production.

An example which attracted my attention to the loss in value occasioned by combining clean stock with dirty grades before working, occurred several years ago before the present methods were generally advocated; a mill had been in the habit of selling its picker and trunk willowed flyings to a local mattress manufacturer for 1 3/4 cents. The stock, however, was not entirely satisfactory even at the price, as they wanted cleaner stock and offered an increase if it could be obtained. Attempt was made to make the same stock satisfy a higher standard of cleanliness by causing it to be run through the willower several successive times, but only slight improvement resulted. A new plan was now employed in that while the stock was run through the willow only once, a selection was previously made between the cleaner and dirtier portions of the flyings and each were willowed separately. These portions were afterwards mixed together and offered to the mattress mill. The difference in cleaning by this method was sufficient to cause an increase in the offered price by 1 cent per pound—an increase which was maintained for all of this grade produced by the mill for two years and until a reworking department was started.

The conservative possible saving mentioned should be sufficient to interest almost anyone having charge of a reworking plant and cause them to experiment along these lines should they already not have done so.

Reworking of cotton mill waste, as carried on by many mills who have not given the subject special attention, does not necessarily carry a

guarantee of increased profits. Frequently mills make an exhaustive study of machinery of the latest types which are especially adapted to economical manufacture of their principal product, and then attempt to reuse their waste by mixing all grades together and running them through the worn out models of machinery which they have discarded when replacements have been made with improved machinery. The fact that this machinery is utterly unsuited to the work and may be the chief cause why the reworking plant fails to pay, is often neglected by mill owners in their attention to improvements for manufacture of the principal product.

Both specially designed machinery and a correct system of mixing are necessary in order to get a reasonable profit from use of waste. Failure to meet these requirements has been the cause of the generally accepted idea that there is not sufficient profit in a reworking plant to make it especially desirable. If run correctly and with well-designed equipment, it will make a profit and a satisfactory one.

QUALIFICATIONS FOR A SUCCESSFUL WEAVE ROOM OVERSEER

By R. J. SMITH, Henrietta, N. C.

In the manufacture of textile fabrics, no branch of the business is more important than that of weaving, nor does anything affect the desirability and selling qualities of cloth more than the weave. The material may be costly, the yarn perfect, everything done correctly in the preparation of the warp, but if not woven to suit the market for which intended, it will have to be sold as an inferior cloth. If the market demands a soft, smooth filling-face cloth and you make it hard and rough with a reedy face, then you have made an inferior cloth and it was not the fault of the yarn but only of the weave. If the market demands a solid-warp-face, and you make it with a filling-face, then you have made an inferior cloth; and it was not the fault of the yarn nor the market, but only of the weave.

A man to be a successful weaver, in this advanced age in manufacturing, must have five or more qualifications. He must know the theory and practical science of warp-preparation; second, he must have knowledge of machinery, and the more the better; third, he must have a character that will command the respect of help; fourth, he must be a student, with a mind open to convictions, and be looking out for improvements both in production (quantity and quality), and for the lowest cost per pound; fifth, he must be able and willing to do. He may know ever so much, but if he will not do what he knows, then he is no good and will soon lose out.

Preparing a warp is not alone the arranging of a certain number of ends in the warp, but it is sizing to suit the atmospheric condition of the weave room and the kind of cloth you wish to weave. Therefore, in preparing sizing, we first consider the numbers of yarn, then the number of picks of filling, and after that the face, whether hard or soft.

In making up sizing for print cloth, 30 warp, 40 filling, 64 by 64, I would use: Starch 11 oz. to the gallon of water. Compound 2 oz. to the gallon of water. Tallow 1 oz. to the gallon of water.

And I use this for my base on all numbers and picks. For fine yarn and heavy picks I can add starch, and for coarse yarn, light picks, take away.

As for the knowledge of machinery. It would be better for the weaver if he knew carding and spinning machinery as well as weaving, but by all means he should know the slasher and looms.

There is but one way to know the slasher, and that is by "practical experience." You may get some good theories from text-books, textile magazines, etc.; but without some practical experience you would be a very poor man to make up sizing and get warps through the slasher correctly.

If the weaver does not know the loom, how can he have it adjusted to suit the cloth to be woven or how is he to keep up with the loom supplies as he should? I say, to know the machine is to get better results, and that is what's wanted.

As for the fourth qualification: to "be a student," this is the greatest secret of success of any avocation in life. Now, when manufacturing in the South has become a science, we must take up new ideas, and not just do as the other fellow did. We must look out for the best. Did you ever stop to think why the other fellow is not still running the room or mill you now have and ask yourself if it was not for something he was short on? If a man is not a student, he had better get out of the weave-room. For the best a few years ago has passed out. Then it was a matter of a good prduction and a low per cent. of seconds. Now it is a good production (quantity and quality) at the least cost per pound. If you are a student, you will look out for the best; and if there is a man in Texas who is getting his weaving for the lowest cost of any in the country, you will find all good mill men looking for the reason why, and they will go to see him and ask the way. Study his methods; learn from him and profit thereby. If you are not looking for the best and keeping up your leadership, improving your room or mill, some man will soon fill your place, and it is right he should. I was told once to get the production, if it took twenty spare hands. Since being with a better mill man, I am not told such, but am taught to get it at as low cost per pound as possible, and as I see it, all good managers now have the same views. Therefore, to be a student, is not to let things in your line grow old.

Tapestry weaving was an art well known in the Eastern countries in the earliest times. Homer speaks of it. In the oldest Hebrew records we read the descriptions of the elaborate and costly hangings "wrought in gold and silver, and in divers colors." Centuries ago, in Eastern countries, the walls of the temples and palaces were lined with silk and cloth hangings, bearing beautiful designs, and were often ornamented with diamonds and other precious stones.

A NOVEL FABRIC

A fabric construction has recently been patented in this country which is designed to produce fancy effects in the filling without the filling threads floating loosely on the back. The inventor gives the following account of the construction: Design fabrics have been made in which the weft threads extend directly across the fabric from side to side; during one traverse from one side of the fabric to the other, these threads are interlaced with the warp threads to form a ground; during the return traverse they extend either wholly above the warp threads to form a figure or design on the upper surface of the fabric, or wholly below the warp threads to form loose floating threads extending across the lower surface of the fabric over the whole area, except an area equivalent to that of the design appearing on the other side of the fabric. These return threads form on the upper surface of the fabric a design in positive while on the lower surface they form the same design in negative. The loose floats on the under surface of the fabric are objectionable because they require a large amount of yarn and produce an unsightly surface which soon becomes torn and ragged.

The object of the new construction is to produce a fabric which is free from objectionable features. Fig. 1 shows the face of the fabric; Fig. 2 is a view of the fabric shown in Fig. 1, along the line, A—A; Fig. 3 shows the double traverse of the filling thread along the line, A—A, of Fig. 1; Fig. 4 is a view of the back of the fabric shown in Fig. 1.

The fabric shown by the drawings is composed of longitudinally extending warp threads and one continuous thread. The former may consist of cotton threads and the latter may be a silk thread, preferably of a color different from that of the warp threads. Portions of the weft thread are suitably interwoven by any type of weave with the warp thread to form a ground, while other portions thereof extend either above or below the warp threads, the parts extending above marking the floral design on the upper surface of the fabric as shown in Fig. 1. In that portion of the design which is shown in Figs. 2 and 3, in which the weft threads are shown slightly separated and not beaten down by the reed, the filling thread at the beginning of its traverse from the left to the right of the web, 1, is interwoven with the warp threads, as indicated by the dotted line. The interweaving extends to the point, 2, from which to the point, 3, the thread extends above the warp, as indicated by the heavy black line, A, and serves to form a part of the floral design visible on the upper surface of the fabric. From the point, 3, to the point, 4, it is interwoven to form the ground; from the point, 4, to the point, 5, it extends above the warp to form another portion, B, of the design, and from

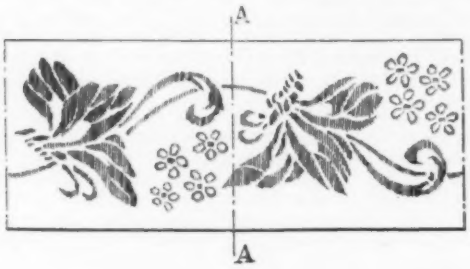


FIG. 1.

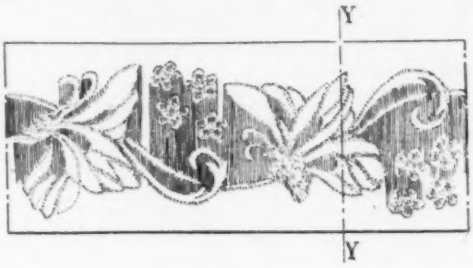


FIG. 4.

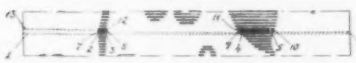


FIG. 2.

FIG. 3.

the point, 5, to the point, 6, it is again interwoven. This terminates one traverse of the thread across the web. On the return traverse it is interwoven with the warp threads from the point, 6, to the point, 7, which lies at the extreme left of the portion, A, of the design.

The ground weaving is not continued beyond the point, 7, although the shuttle continues its movement to the edge of the web near the point, 1. On the return movement of the shuttle no interweaving of any kind is accomplished until the point, 7, is again reached when the thread is brought above the warp threads and continued thereabove to the point, 8, to form the portion, A', of the design. The loop or loose thread formed by this movement of the shuttle from the point, 7, to the edge of the web and back again to the point, 7, is taken up by the further shuttle motion to the right. A similar shuttle action occurs at the right of point, 10. The thread itself, irrespective of the travel of the shuttle, turns back upon itself toward the right from the point, 7, extending above the surface of the warp to the point, 8, to form a portion of A' of the design, lying next to the portion, A, between the points, 2 and 3.

FORTY YEARS AGO

Taken from the files of the Industrial Record, now the Textile World Record.

We have in our library the complete files of the Textile World Record, formerly the Industrial Record, from 1868 down to the present time.

The Industrial Record was the first textile journal published in the world, to our knowledge; certainly it is the only one which has preserved a continuous history for forty-five years.

It has been interesting to us, and we think it will be to many of our readers, to look over those files to the time when the textile industry in America was beginning to expand.

It has been suggested that we reprint some extracts from those old files from time to time. The following items are taken from the issue of 1870 to 1882:

January 1, 1877. Middling uplands cotton at 12 1/2 cents a pound. XX Ohio wool, at 44 cents a pound.

April 1, 1877. U. R. Tsatlee raw silk, 1 and 2, quoted at $8 a pound. XX Ohio wool at 45 cents a pound. Middling uplands cotton, 11 1/2 cents a pound.

May 31, 1878. Middling uplands cotton, at 11 1/4 cents a pound. XX Ohio wool, at 38 cents a pound. Tsatlee silk at $5 a pound.

June 1, 1878. Meeting of knit goods manufacturers at the Metropolitan Hotel, New York, to organize for the correction of trade abuses in the marketing of knit goods.

September 1, 1878. Severe depression in the woolen business. Many mills shutting down, reducing wages and going into bankruptcy.

September 1, 1878. Middling uplands cotton quoted at 12 1/2 cents a pound. XX Ohio wool at 37 cents a pound.

October 1, 1878. The Milwaukee Sentinel publishes the following comparison of prices of leading commodities, 1864 and 1878:

	1864	1878
Crushed sugar	$. .20	$ .10
Cuba sugar	.21	.08
New Orleans molasses, gal.	1.35	.40
Coffee, lb.	.46	.40
Cotton, lb.	1.00	.12
Pork, bbl.	45.00	9.00
Gold	2.50	1.00½
Prints	.40	.06
Delaines	.40	.10
Ginghams	.40	.06
Checks	.55	.18
Best ticking	.75	.25
Balmoral skirts	5.00	1.50
Brown drills	.60	.12
Canton flannels	.65	.08
Bleached muslins	.55	.12
Brown muslins	.55	.08

May 15, 1882. The Philadelphia Association of Textile Manufacturers take preliminary steps to establish a textile school.

May 15, 1882. Announcement is made that the firm of A. T. Stewart & Co., New York, will discontinue business.

June 15, 1882. President Arthur appoints members of the new Tariff Commission. John L. Hayes, secretary of the National Association of Wool Manufacturers, is made chairman.

July 28, 1882. The Tariff Commission at Long Branch listen to the testimony of textile manufacturers regarding the revision of the textile schedules.

October 16, 1882. Richard Peters, of Georgia, for the growers of mohair, and J. H. Tingue, of Connecticut, for the manufacturers of mohair, appear before the Tariff Commission at Philadelphia.

November 15, 1882. The Lowell Machine Shop and the Kitson Machine Co., of Lowell, Mass., supply the machinery for the new cotton mill of Santos Peixoto & Co., Pau Grande, Brazil.

December 15, 1882. The Tariff Commission makes a report to Congress.

Correspondence and Notes

UPON TEXTILE TOPICS AT HOME AND ABROAD

THE MANUFACTURE OF ELASTIC FABRICS

BY SAMUEL BROWN

(Continued from June.)

Elastic fabrics may be divided into two distinct classes, viz, single and double cloth. The single cloth weave is largely employed in the making of goods used for garters and arm bands. The double cloth weave is generally although not exclusively used for suspenders, shoe goring and corset trimming webs. In the single cloth weave we have the element of light weight and long stretch, whereas the double cloth produces a much heavier fabric and a relatively shorter stretch. The gang loom is used for elastic web weaving. This loom is built in a variety of types for the different fabrics. The number of spaces or shuttles in the looms range from about twelve, as used for shoe goring, up to about forty-eight, for light garter webs. Fig. 12 is a front view of a 36-piece circular shuttle and cam, suspender loom, made by the Crompton & Knowles Loom Works. Fig. 13 is a rear view of the same loom. These views do not show the cotton warp creel mounted.

Attempts have frequently been made to weave plain elastic goods in broad looms, with a multiple of sections side by side in one wide piece, each section being separated by "doup" or locking thread, and during the weaving process, to cut between the douping threads with a series of knives at the breast beam. A satisfactory selvage cannot be obtained in this manner and the plan has been abandoned time after time. Elastic fabrics, perfect in every other respect, will be absolutely unmarkable should there be the slightest variation in the selvage. The outside rubber thread exercises so much control over the stock covering it that any irregularity of tension on the filling, or variation in the weighting of the selvage warp will ruin the goods.

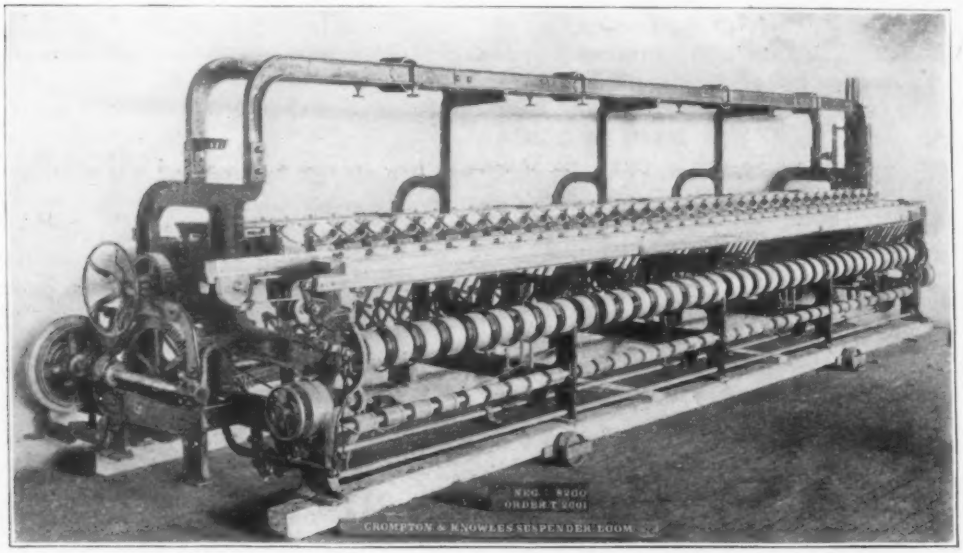


FIG. 12

The method of mounting the cotton warp in the loom is similar to that employed for narrow non-elastic fabrics. The looms are usually arranged to carry six separate warps for each strip of web. This number of warps are needed for most double cloth webs, although in the single cloth fabrics, two warps are usually used, a body warp and a gut warp. These warps are mounted one above the other, in a creel at the back

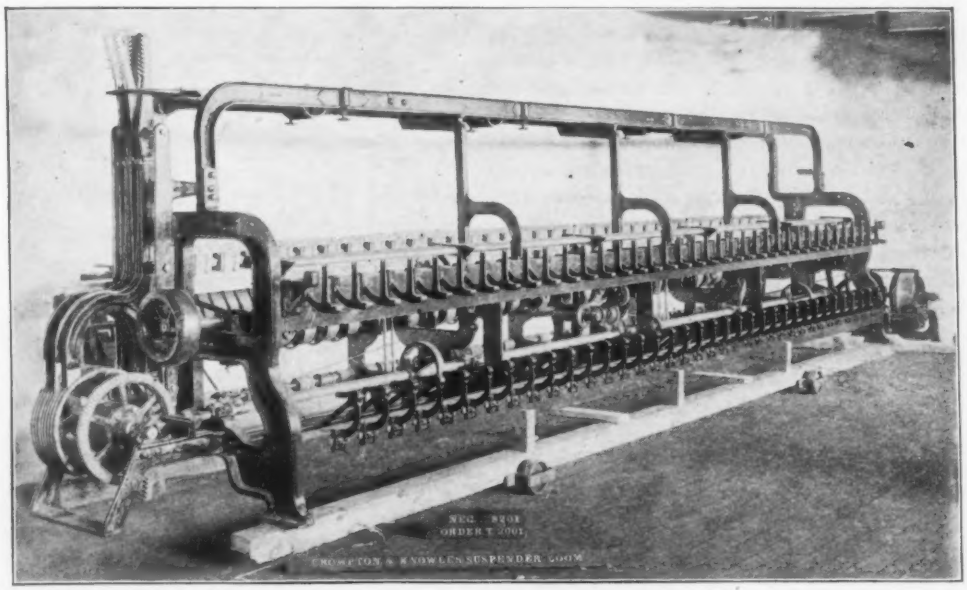


FIG. 13

of the loom, and are operated automatically.

Fig. 14 shows two warp beams, A, mounted in this way, and the levers, B. As the goods are woven and taken down at the weaving line, the warps, C, passing around the pulley, D, slightly raises the nose of the lever, B. This moves the heel of the lever from contact with the warp beams, and so releases enough warp to bring the weight, E, on the nose of the lever again. The heel of the lever thus comes in contact with the beam and locks it again. This operation is repeated at each peck of the loom. The weight is regulated according to the character and size of the warp.

The rubber warp, which has been described in a former article, is the one element which calls for great care and on which the final value of the fabric mainly depends. It must be woven into the goods at the highest tension obtainable, without chafing or breaking, so that when the woven goods come through the press roll, the desired contraction will take place and they will have plenty of "life". Should the rubber be woven in slack, it will not contract after coming through the press roll and the goods will be non-elastic and worthless, or "dead", as it is termed. These worthless and unmarketable goods cost much more than perfect goods. More rubber is used when the rubber warp is slack than when woven under the proper tension, and rubber is the most expensive part of the goods.

Fig. 15 is an enlarged sketch of the warp lever, B. The working operation of the rubber warp is shown at Fig. 16. The warp beam is placed in a rack, A, which is at the back of the loom, the delivery of the warps is on a direct line with the breast beam, B, each individual rubber thread passing through the harness, C. Over the entire

face of the warp beam is hung a friction cloth which is fastened at the top to the rod, D, and connected at the bottom to the notched lever, E, on which is hung an adjustable weight, F. The weight, F, and the graduated lever, E, enables the length of the friction cloth to be adjusted as the rubber beam is emptied.

There is no fixed rule for the governing of the tension applied to the warp. The effort is always made to reach the highest tension attainable without breaking the threads, or causing them to chafe at the reed, as chafing weakens the thread and reduces the power of contraction. It will sometimes spoil the appearance of the goods by the chafed bits of rubber pricking up through the face. A high and uniform tension of the rubber warp is of such importance that most manufacturers keep men specially for testing, rather than leave it to the weavers. These testers acquire such a keen

FIG. 15

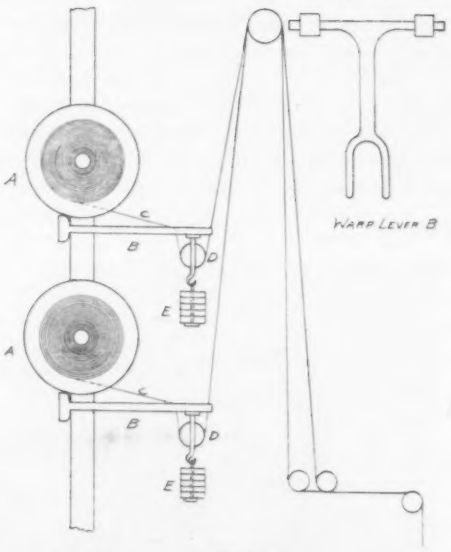


FIG. 14

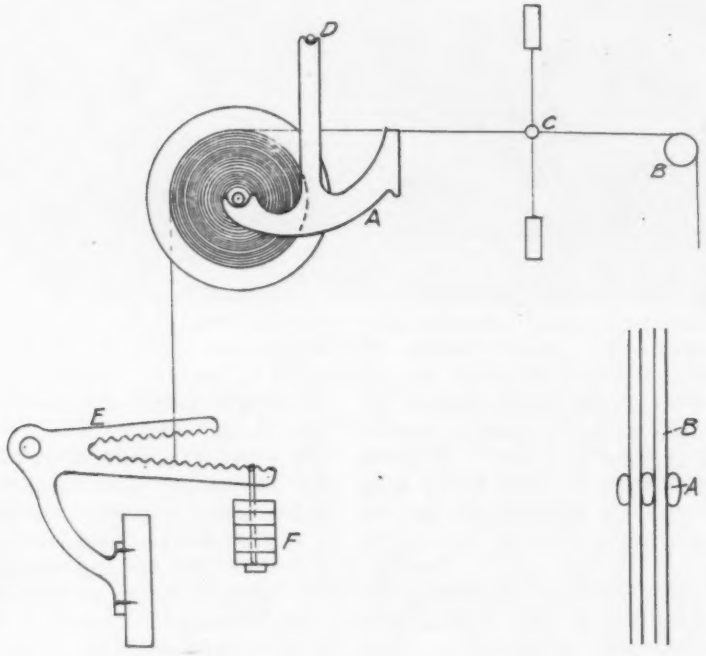


FIG. 16.

FIG. 17.

sense of touch by constant practice that they get very economical and satisfactory results. Talc or soapstone is freely used as a lubricant to reduce the risk of chafing and

breakage of the rubber thread. The threads are arranged to pass through a bed of plush, loaded with talc as the rubber warp leaves the beam. The talc adheres to the threads and makes them very smooth, this counteracting the effects of friction. This is especially important in damp weather, which sometimes makes it impossible to work, even after all these precautions have been taken. A dry atmosphere is needed for elastic web weaving and everything is done to bring

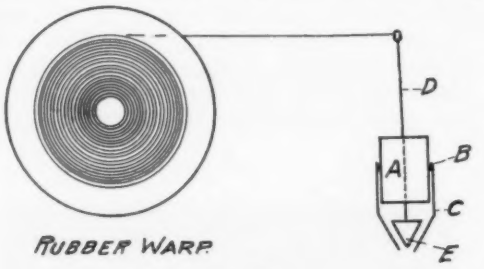


FIG. 18

about such conditions. In the weaving of the average type of elastic web, with say 60 picks per inch, the reed necessarily passes by the rubber about 700 times from its entrance into the shed until it reaches the weaving line. The wear on the rubber during this passage is very severe. To reduce the friction to a minimum, elliptical dents are used in the front reed, as shown at Fig. 17. The contact is thus made as small as possible. The elliptical dent through which the rubber thread passes is shown at A.

The outside, or edge threads of the rubber warps are the most liable to chafe and break and it is to these threads that special attention must be given. The filling as it repeatedly passes around the selvage of the goods in the process of weaving, slightly nips up, or crowds the front reed at its extreme edge and gives the selvage rubber less working space. This increases the liability to friction and risk of breakage. To safeguard this increased risk of breaking the rubber thread at the edge and at the same time not diminish the desired tension on the warp, it is customary to use an electric device to ring a bell, when one of these threads break. This device is shown at Fig. 18. The details may be modified according to the character of the goods made and the type of looms employed. A strip of wood, A, is placed under the rubber warp threads as they leave the beam. Electric wires, B, are placed on either side of this strip. Plates, C, are placed in contact with the wires, B. A series of holes are bored through the strip of wood, directly under the ribber threads on the wide. To each of these threads is hung a looped steel wire, D, which passes through the guide holes at the bottom of which is attached a brass cone, E. Should the edge rubber thread break, the cone drops between the V shaped plates and completes the circuit, which rings a bell to warn the weaver of the breakage.

DESIGNING AND COLORING OF SCOTCH TWEEDS

By THOMAS WELSH, Harwich

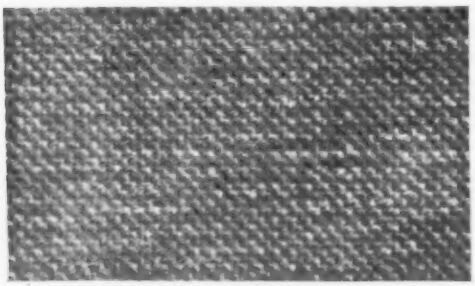
From the Journal of the Textile Institute, Manchester, England.

It may be that Scotch tweed originally owed something to its name. It was a fortunate error in ordering that led James Locke, a woolen merchant in London, to order "tweed" instead of "tweel". For about the time that Galashiels tweeds were being introduced Sir Walter Scott was making the name of Abbotsford and Tweed famous in another connection. Every reader who felt the thrill of the wonderful romances that were penned on the banks of the Tweed would instinctively turn with interest and expectancy to anything that bore the charmed name. It is on record that Sir Walter himself was one of the earliest wearers of Scotch tweed. He wore a pair of black and white checked trousers. It was with that design that the tweed trade began. The man who set the fashion wore trousers made from an old shepherd plaid. The first order of tweeds sent to London in bulk was six pieces of black and white check made in Peebles, to the order of Archibald Craig, of Edinburgh.

Colored checks were introduced by accident. It happened that a manufacturer had made a number of pieces, and the white was so impure and dirty looking from being mixed with gray wool that they could not be sold. Someone suggested that if the pieces

were dyed brown the defect would be covered. The suggestion was acted upon, and a new check of black and brown was the result. The new color was sent to London, and sold rapidly, and repeats were ordered. It was a short step to dye black and green and black and blue. Another short step was the making of broken checks to be dyed in all these colorings, and the trade increased amazingly.

FIG. 1



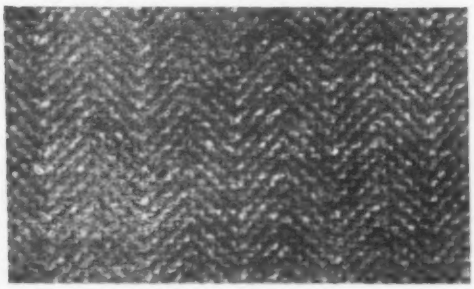
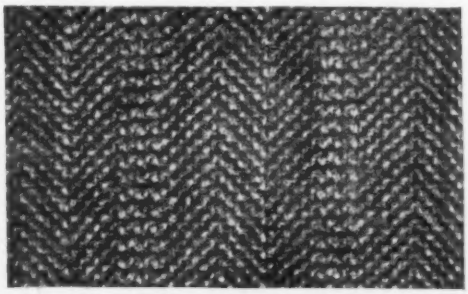


FIG. 2

All this time the cloth was made from coarse, rough wool. In 1833 fine foreign wool began to be used. Colored tweeds made from foreign wool in granite and heather mixtures in great variety of bright colors were soon put on the London market. Mr. Craig collected ideas for colors in the bed of the river Garry in the Pass of Killiecrankie, mostly granite, porphyry, and jasper, which he found rich in reds, greys, and greens, beautifully mottled and mixed in finely contrasted colors. Heather mixtures were first asked for by some gentlemen of the rod and gun, who enquired for colors which resembled their shooting ground. Galashiels manufacturers went to the hills and gathered heather, ferns, and grasses to give them ideas for the coloring of their ranges.

Scotch tweeds are always amde to order. Patterns are made and submitted to the wholesale houses a year before the cloth reaches the consumer. In September, 1912, manufacturers were busy getting out new colors, new cloths, and new designs which will be the very latest things in men's wear in November, 1913. A manufacturer finds it to his advantage to have some new cloths every season. Customers get tired of seeing the same cloth year after year, and it is easier to get a good price for a new cloth than to raise the price of an old one when the price of wool goes up. New colors have

FIG. 3



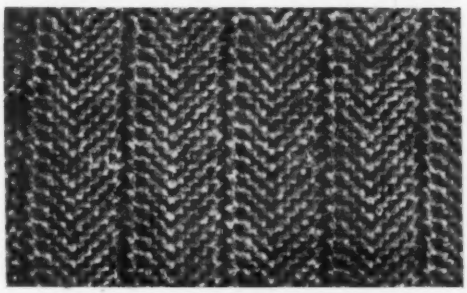


FIG. 4

to be added. A cloth that is not too old may be made to run another season with the addition of something new in the way of color and design.

When these are decided upon ranges are made. First of all, trial ranges are made for designs. The designer thinks some idea he has in his mind will look well, and he makes a range to try it. On the same range

he makes four or five other designs on similar lines. If they are checks there must be one weft for each warp; if they are stripes one weft of a few inches will show them all. After one weft, alterations are made; lines are changed or added before each new weft, until the range is complete with some 25 or 30 designs all more or less different.

Figs. 1 to 9 show some designs made in this way. An end and end pattern, Fig. 1, drawn on 16 shafts to facilitate alterations was put into the loom. The other designs were made by changing the weave or by adding stripes. Suppose Fig. 2 is selected for a grey range and Fig. 8 for a colored range. Fig. 3 is wanted in five depths of grey, and

FIG. 5

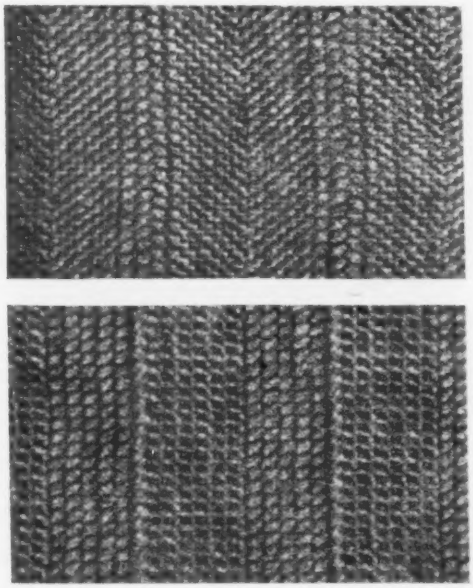


FIG. 6

Fig. 8 in five different colors, also in different depths.

The warp and weft of Fig. 2 would be: 1 black 1 white, 1 black 1 No. 1 grey, 1 black 1 No. 2 grey, 1 black 1 No. 3 grey, 1 black 1 No. 4 grey. Wefts the same as warps.

The design is shown at Fig. 14.

The coloring of Fig. 8 presents more difficulty. The warps might be: 1st, black, white, black and white twist. 2d, brown, white, brown and white twist. 3rd, blue, grey No. 1, blue and light grey twist. 4th, olive, grey No. 2, grey and light grey twist. 5th, green, grey No. 3, green and grey twist. Wefts: Color as warps without the twist.

This would be the order of the range if it were wanted plain, but in most cases it is an

FIG. 7

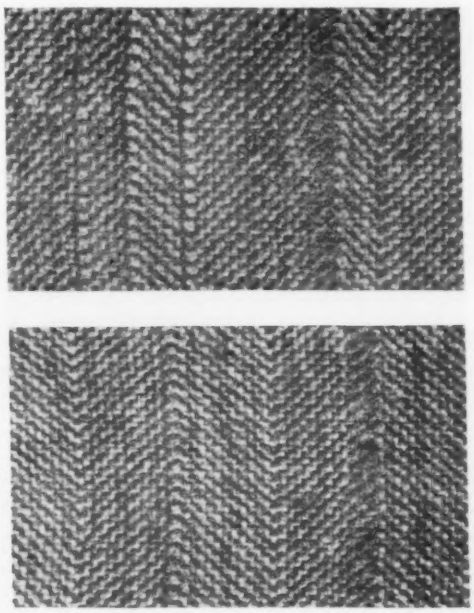


FIG 8

improvement to add a line or check of bright color, and this has to be done with great care. Each warp must have a color that corresponds with the ground, and it is best to have all the colors different. And, again, the colors in the several warps must show with the same strength. There must not be some bright and some soft; they must be all alike, strong or weak. To do this successfully the designer requires several depths of the same color, so that he may have light tones for the light grounds and dark for the dark.

Frequently ranges are made in monochrome, all one color of ground. Variety is obtained by making different sizes of stripes or checks. If a range is made in blue ground with lines composed of two ends of white or color the first warp might be made with 1/2

inch space between the lines, the second 3/4 inch, the third 1 1/8 inches, the fourth 1 1/2 inches, and the fifth two inches. All the lines may be, white the first weft, lavender the second, green the third, peacock the fourth, and crimson the fifth. The buyer would then have a selection of five sizes and five colors in each size.

In recent years another make of cloth quite distinct from the ordinary tweed has been put upon the market successfully by tweed manufacturers, and has established itself in the woolen trade; that is the reversible

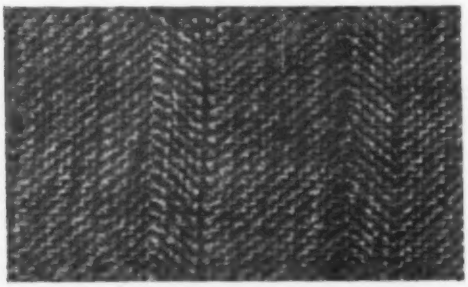


FIG 9

cloth. It first became exceedingly popular in the form of golf capes, and is now used for ladies' coats and costumes, for motoring coats, for men's overcoats, and for rugs. The feature of it is that the face and back are different from each other in color and very often also in make and quality. It is possible for a lady to have a reversible skirt made up in such a way that she may appear at one time in a modest blue, and at another in the tartan of her clan. A gentleman whose name is Cameron, but who is in doubt whether he belongs to the Lochiel or the Erracht branch of his clan, may have a Lochiel on one side and an Erracht on the other, and feel that in rugs at least it is possible "to have it both ways". It is possible to have woolen on one side and worsted on the other; or Cheviot on the face and Saxony on the back.

The making of reversibles presents a problem that is absent from the making of ordinary double cloths. The later are made with face and back as near each other as possible in color and design, and are tied to each other by bringing a weft thread from the back over a warp thread of the face or any similar method. So long as the weave on the face is not broken by the tying end no harm can be done, but with reversibles the face and back are different colors, and while being tied to each other must be kept as separate as possible. Reversibles must be as perfect as if they were single cloths sewn together after they are made. If they interweave with each other they are almost certain to show through. The faint indistinct outline of the checked back on a plain face is a fatal defect.

To tie the face and back of a reversible a third warp is employed. This is placed between back and face, and does not appear on either side. The tying is done by passing this center warp over a weft thread on the back of the face cloth and under a weft thread on the face of the back cloth. Fig. 10 shows in section the method of tying, and Fig. 11, the full weaving design of an end and end reversible. The dashes show all the face warp raised while the back is being

FIG. 10

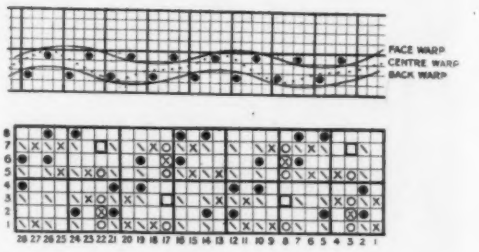


FIG 11

woven; the spots, the face; and the crosses, the back; the circles, the center warp lying between the two; the squares, the center warp sunk to catch the back weft; and the crosses within the circle, the center warp raised to catch the face weft. Except the blank squares all the marks rise.

Fig. 12 shows the section and Fig. 13 the weaving design, where there are two ends on one side and one on the other. Needless to say, there are other methods of making reversibles. The two weaves will illustrate how it is done. On the make given in Fig.

11 the different sides may be made of different qualities, Cheviot face and Saxony back, or woolen face and worsted back, but the yarns must be about the same weight. On Fig. 13 cloth the yarn on the back must be 3 1/2 or 4 times heavier than the yarn on the face. When reversibles are plain or have only small patterns on both sides ranges are made in the same way as in single cloths; that is, 3 or 4 or 5 colors in warp and weft. When they are check backs they are made with 3 or 4 or 5 colors on the face and one large check on the back.

Each manufacturer has to make a great number of ranges and selling samples every year. In every factory a staff of pattern workers is kept more or less busy all the year round. It is not far from the mark to say that for every loom in a factory 15 ranges and 100 yards of selling samples have to be made every year. An establishment with 100 looms will on this estimate make 1,500 ranges and 10,000 yards of narrow width cloth, sufficient to make 1,530 suits, each year for patterns only at a cost of something like $7,500.

Merchants do not pay for ranges. Even if they ask special ranges for themselves they get them free of cost. Selling samples are paid for at piece price, but as they are woven narrow and are short they cost nearly double the price paid for them. The great number of ranges made is necessitated by the practice of confining designs to a single merchant. Many buyers make it a condition that all the designs they take up shall be confined to themselves. Some are content if their designs are confined to them in their own country; others insist that no one else in the wide world shall see them. Merchants seldom order from ranges. Having selected the styles and colors they like, they proceed to order selling samples, which may be 1/2 yard or may be 10 yards; 2 yards is a fairly common length. Only after these are delivered and found satisfactory are orders placed.

There is great advantage in a good name, but it is not everyone who can live on a good name. It must be said to the honor of pioneers of the Scotch tweed trade that they lived up to the reputation of their country, and made their productions worthy of the name of "Tweed." And it can also be justly said of their successors that they worthily sustained the good name handed down to them by their fathers. They do this successfully by keeping in all essential matters to the traditions of the pioneers, good, pure wool, bright colors, and priority of design. Every process of manufacture has been revolutionized since the days of the billy, the hand jenny, the hand loom, the waulk mill, and the tenters, but the materials put into the best Scotch tweed remain essentially the same. Many new qualities of wool have been introduced; the world has been searched for new qualities. Breeders have exercised their skill to produce new sorts. Experience has taught how to get the best results from the use of each sort. Various qualities have been blended to get different effects. Yet in the production of the best cloths only pure wool is used. It may be from Australia or from South America or from Africa, or it may be from the Cheviot Hills at our own doors, but in every case it is pure wool. Good wearing cloths, bright, sparkling colors, can only be obtained from the use of pure wool. Fibers that have been through all the processes of manufacture, have been woven and been pulled to pieces

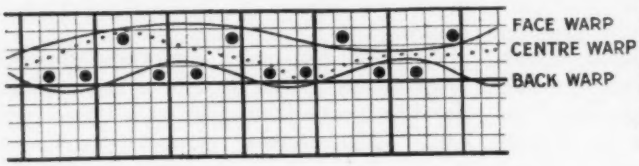


FIG. 12

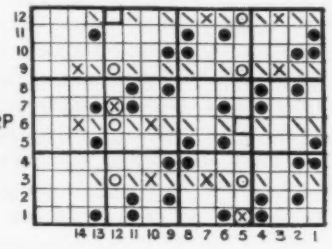


FIG 13

and manufactured again, are in the very nature of things past their best, and nothing but the best can give the best results. A Scotsman's styles may be imitated, but his cloths and his colors are inimitable, except in the material he uses himself—good, pure wool. Great care and skill are exercised in the selection and blending of the different wools, in order to get the utmost possible value in effect out of each. For heather mixtures, with their wealth of bright fancy color, reds, yellows, blues, greens, russets and lavenders — Cheviot and crossbred wools, with their lustrous fibers, give the best result.

The famous Bannockburn tweeds are made of Cheviot, and the very best dark heather overcoatings are produced in Sutherland Cheviot wool. For less highly colored cloths the various qualities of Saxony are employed. These make a finer looking, smoother, and softer handling cloth. The outstanding feature of a good Saxony cloth is the clear and clean appearance of the plain colors that compose the ground, an effect only to be obtained from the careful finishing of good wool. A good Saxony woolen cloth does not need bright color, and for that matter neither does a good Cheviot, but where bright color is wanted Cheviot shows it best. A very large proportion of tweeds are made with very little fancy color and in small designs. The average man does not like a conspicuous color, and must have his designs rather under than over two inches in size, and yet he must have distinction. It is this that constitutes the greatest difficulty of the tweed designer. Everyone knows it is much easier to make something distinctive in a large design and a high color than to make something different in a small design and a quiet color. Loudness is easier produced than "quiet go."

With this object new qualities and new cloths are constantly being sought after. Not infrequently two or more qualities are combined in one cloth to get new effects. These qualities may be mixed in the carding and spinning. Camel hair may be mixed with wool to give a new handle, or mohair may be mixed to give a new effect, or they may be mixed in weaving. A Saxony cloth gets a new character when it has a little Cheviot mixed with it in the weft. The warp may be light color and the weft dark, composed in whole or in part of a good quality of Cheviot. The latter responds to the milling more quickly and in a different way, and gives a cover on the cloth before the Saxony shows any signs of bursting. The clearness of the Saxony shines through the cover of the Cheviot, and the resulting effect is very good. The most careful attention is given to the production of new colors. Every season some new mixtures and solids for grounds are introduced. Fresh twists and other new colors for checks and stripes are secured.

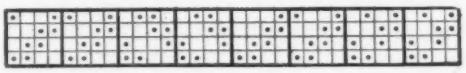


FIG. 14

Color is the most important point in Scotch tweed. The first thing a prospective buyer sees when he looks at a range is the color. After further examination he may not like the cloth or the design or the price, but if the color does not satisfy him he passes it over. If, on the other hand, the design is not to his taste, he may suggest modifications or he may even be induced to take it as it is if the colors are really well done. Nothing that is not well colored is of any interest to him.

Very few original designs are made. A young designer may sometimes think he has hit on something new; that is evidence of his youth. An old one never makes that mistake. The endeavor is to find out what is likely to be fashionable in design and color, and to follow it up. The Scotch tweed designer produces the right thing in design and color at the right time. If it is a common design, by means of his good quality of wool and his tasteful colors he produces it uncommonly well. The great bulk of the trade is done on common designs. Quite recently designs on the end and end basis have been very much in vogue. It is one of the oldest designs that can possibly be made, yet produced in good quality and in clear,

clean colors it sold well. It was varied in all manner of ways—small and large herringbones, small and large stripes, twist stripes, colored stripes, silk stripes, stripes of 2 and 2 in a vast variety of sizes, and stripes of fancy weaves, diamonds, and diagonals were all utilized to give variety to this commonest of designs. It may be stated as a truism that common designs uncommonly well done are the staple productions of the tweed trade.

It is impossible to say just how a designer gets information as to what styles are likely to be required. He notes what designs have sold best, observes carefully if any one kind of design or any one kind of color is going better than others. Especially he looks for any signs of change—if emphasis is being laid on any particular class of design or color that did not receive much attention in previous years, or if any good customer is asking for any special idea. Then the person who sells, who comes into immediate contact with the customers, sometimes gets a hint or he sees something that looks different, and transmits his information to the mill. It is a matter of eternal vigilance; often a matter of intelligent anticipation.

When a hint is given the particular style has to be developed in as many ways as possible. It has to be brought out in all the cloths and colors most suitable. Other designs on similar lines have to be made. Various alterations more or less slight have to be tried. Whether it is stripe or check, it can be made larger or smaller. A little bit of fancy weave may also be introduced to give variety to the appearance. Colored check or stripe may be put on, or a line or two of silk may be added.

If it is a new color that is asked for, similar efforts must be made. It must be dyed at once; other shades of the same color, lighter or darker, must be produced. Mixtures with the new color for the basis have to be made. Ranges with the new color for the leading feature in combination with as many appropriate colors as possible in all the favorite styles must be got ready quickly, and thus it is that soon great numbers of ranges on the lines of the original suggestion are quickly made. The manufacturer who can be first on the market with good ranges of the right thing at the right time has the best chance of success. I must not, however, be understood to affirm that Scotch tweed designers never produce new designs. While they are eager to get hints from the outside, and put themselves to much trouble to get them, they labor hard to get out new ideas of their own. Whether these ideas are absolutely fresh or are only ingenious adaptations of other designs, they contain some valuable elements of novelty that give selling property to the goods. Less than other cloth designers do they depend on fancy weaves. All the arts of getting quiet yet effective results from small turns of twill and from cuts, and from the introduction of a few ends of hopsack they thoroughly understand. They are experts at ornamenting their designs with a narrow stripe of mayo or diagonal, and know how to work in a small diamond or diagonal or series of spots to make a difference. They are masters of a host of cunning little artifices by which the common is lifted out of the commonplace, and the old is made to renew its youth.

The Scotch designer is pre-eminently a colorist. He is an artist in the arrangement of color in mixture, check, or stripe. In 1830 Mr. Craig wrote that the secret of success for the rising trade of his day was "purity of material, durability combined with cheapness, great comfort in wear, and priority of patterns." If to that we add tastefulness and purity of color we have all that goes to make the Scotch tweed so deservedly famous.

—+—

Worsted thread derives its name from the town of Worsted, in England, where it was first made during the reign of Henry V.

During the fourteenth and fifteenth centuries small quantities of indigo found their way into Europe, along with methods of application, the Italians being the first people in Europe to use it.

AN OPENWORK FABRIC

The illustrations show an openwork fabric which is described by the patentee as follows: The fabric is adapted for high-class work, such as lace curtains, bed covers, dresses and the like. To produce an openwork fabric of a design which will in any way correspond to or compare with this fabric it has heretofore been necessary to employ highly skilled labor to operate complicated machinery which has made the goods very expensive. The fabric is so formed that it may be produced rapidly by simple attachments ap-

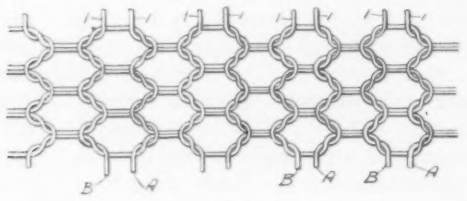


FIG 1

plied to the ordinary loom. A feature in the construction of the fabric is that the warp threads have the appearance of running in pairs, both of the threads of a pair being alternately carried apart and brought toward each other as they are passed around each successive filling thread throughout the fabric. When the warp threads are drawn taut by the beating up of the lay the mesh takes substantially a hexagon shape, but by drawing out the fabric in different directions a variety of shapes to the mesh may be obtained.

Fig. 1 is an enlarged view showing the construction of the finished fabric; Fig. 2 shows the appearance of the warp threads as the threads of each pair are carried alternately apart and brought toward each other on being passed around each successive filling thread, the view representing the threads before they have been drawn taut by the beating up of the lay. Fig. 3 is a perspective view representing in detail the way or direction the warp threads are passed around the filling threads.

Referring to the drawing, 1 indicates the warp threads, 2 and 3 indicate the filling threads. The warp threads are looped to form a shed, whereupon the shuttle carrying the filling threads is passed through in the ordinary manner. After each operation of the shuttle the fabric is beaten up in the usual way, and the warp threads then looped in a reverse direction, after which the shut-

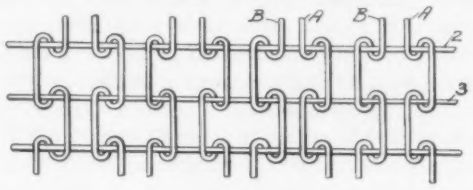


FIG. 2

tle is again operated. This operation is continued until the desired length of fabric is completed, the warp threads being looped alternately in opposite directions, and the filling thread passed through each loop. In the fabric thus woven, the warp threads have the appearance of being run in pairs, A and B. Every thread is moved in a lateral direction opposite to the next adjacent thread as it is passed around each successive filling thread. Thread A is set off to the right and

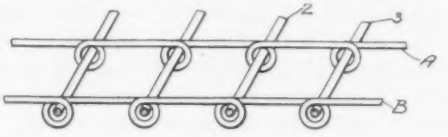


FIG. 3

passed around the filling thread, 2, and then set back again or to the left and passed around the filling thread, 3, and so it alternates back and forth as it is passed around each successive filling thread. As the warp thread, A, is being set to the left the warp thread, B, is set in the opposite direction and so continues to be moved back and forth in a direction opposite to that of the warp thread, A, as it is passed around each successive filling thread.

As the threads are subsequently drawn taut by the beating up of the lay, a mesh is formed in substantially a hexagon shape as represented in Fig. 1. On being drawn out in other directions a square, diamond or other shape of mesh may be obtained. By moving the warp thread in the direction parallel with the filler thread as it is being passed around the same, the effect is substantially that of tying a knot. When the threads are drawn up they will take the position illustrated in Fig. 1 and thus naturally be retained in the desired position.

ENGLISH NOTES

By Our Regular Correspondent

Bradford, Eng., June 25, 1913.

Advertisements inserted by American firms in want of agencies for British textiles have been rather numerous in the English daily papers and some inquiry has been made on this side for the names of good importing houses in the United States. It does not appear that much more has been done than the taking of information and the placing of requests for samples. There have been various American textile manufacturers over upon these errands. Some of them have found the class of information they wanted easy enough to get and have indeed accumulated more than they could assimilate readily. They have obtained fair ideas of the general cost of getting work done in England and have been shaping their opinions as to the possibility of importing materials in a more or less fully manufactured form. Any others who may be coming will do well to arm themselves with introductions to parties in two or three different branches of trade and if they are content to obtain knowledge piecemeal they may learn plenty. The sub-division of industry which makes one man a spinner, another a dyer, and another a commission weaver or comber greatly assists the inquirer to see the facts from different angles. Members of the textile supply trades are able by their special connections to be of direct assistance to visitors and in point of fact recent visitors have found their help most useful.

* * *

This subdivision of the textile industry is one of the first things to command the attention of the investigating American. A feature that is noticed later is the large variety of goods that any one weaving mill turns out. The variety comes rather from necessity than choice and manufacturers—for example in the dress goods line—look back fondly to the days when they used only a dozen different fillings, could weave on one warp for weeks and be certain that another exactly similar warp would take its place on the loom. The certainty now is that the loom will have to be remounted entirely as soon as the short warp it contains has been felled, and instead of having only a few fillings to work with a manufacturer may and does have as many as two or three hundred. The changes all mean expense, delay and trouble, but they are the price of success. The case is not materially different in some of the carded woolen mills. Where twenty years ago a few designs of no particular merit and a few colorings brought in a sufficiency of work, designs and colors are twenty times more numerous and have to be striking and smart. In consequence there is a great deal more trouble and expense in dyeing and blending and much more room is required to do the same amount of work. The general result is satisfactory, but management is more of a strain and the specimen American manufacturer whose constant aim is large quantities to few patterns does not envy the Englishman this part of his lot. However, it is a condition to which Americans may be reduced against their own wills, just as the English have been. It is not that we do not know or have not tasted the economics of large scale repetition work, for these are known well and their loss is deeply regretted. But the public wants variety and novelty more than ever it did and manufacturers have no alternative but to give the public what it wants. The changes are the outcome of industrial evolution and there is hardly a department of textile industry in this country that has not its parallel, although it is naturally in the weaving trade that the complexities achieve their maximum.

* * *

A visitor to one of the large English textile schools took diligent note of an observation made by the principal. The teacher regretted that as soon as they had completed their course his best students left, one and all, for the United States. The stranger thought this fact unlikely to dispose English textile manufacturers to show munificence to institutions largely engaged in arming their rivals. Yet less is heard of this matter than of the training of foreign subjects who in some English textile schools

are made to pay extra, or double, fees. The $80 to $100 paid for a year's day courses is far from covering the cost of the educational process and the balance is met from public funds. As managers, superintendents and erectors Britons have done a great deal towards the development of industry abroad. The Calcutta jute factories are managed by Scotsmen to a man. There are still Englishmen in the cotton and worsted mills of the Continent, although the proportion is not as heavy as at one time. In Brazil, Australia, China and in almost any country in which there is a mill there are some English managers or workers. As some mitigation for their loss to domestic industry it is fair to mention that on the whole they do well for themselves so that the public money expended on their training is not utterly wasted.

* * *

With the aid of a small grant from the government experiments in flax growing are being renewed in England at two points selected for the special suitability of the soil. At Selby, Yorkshire and Yeovil, Somerset, seed from Russia and Holland has been sown and the crop is due in September. By that time central retting depots should be ready at which the extraction of fiber will receive expert care. The experiments are being made under scientific observation and the result should go far to determine whether the flax culture can be revived. Flax grows and is spun in the North of Ireland and at one time was raised in many parts of Great Britain, but relatively to other produce did not prove itself advantageous to the grower. It is an axiom that common flax can never pay well here, but a high-grade fiber prepared for market in the best manner and selling at such prices as now rule for good imported flax may be a more attractive proposition. Besides what we grow in Ireland we consume 60,000 to 90,000 tons of flax annually, mainly Russian in origin.

* * *

There is some curiosity to know in what manner Mr. Secretary Redfield arrived at his highly astonishing figures as to the comparative efficiency of British and American workpeople. In the absence of direct evidence it can only be supposed that he has accepted bulk figures which, in the case of England at least, do not accurately portray the situation and are certainly not comparable on a level basis with any available bulk figures taken in America. Ignoring for the moment the very different scales of values current in the two countries, it has to be borne in mind that, whereas American mills buy their materials raw and work them up to the stage of cloth in their own country, English manufacturers have a very large business in semi-manufactures for export. The natural result is nonsense when no heed is paid to the English export of yarn and when it is assumed that an increase of $100,000 in value represents equal energy however that increase may be effected. It is to be surmised that Mr. Redfield has made use of the British Census of Production (1907) in producing his fallacious exercise and the report of that census expressly disclaims any pretention to completeness in respect of yarn sent abroad or sold outside the trade. Except in the case of woven goods the English census is destitute even of the semblance of authority. Lancashire and Yorkshire take the comparisons as a good but rather careless joke.

* * *

London jobbers of textiles have directed the attention of manufacturers, dealers, retailers and the public to the drawbacks of the fixed price system of selling drapery goods. Everyone who has seen an English draper's shop knows how the prices end with 11d, 11 1/2d or 11 3/4d; which is to say they are kept just below the 12d, or shilling, to preserve the illusion of cheapness. The step is long from one price to the next and in times of steadily rising prices the artificial barriers become a nuisance; although English retail prices are not quite so much dominated by fixed limits as are American ones. A large manufacturer of fancy cotton fabrics, which are sold as proprietary goods at retail prices which he fixed and maintains for his customers, has used extensively a system that avoids the eleven penny tyranny at least

at present. Instead of being priced by the yard the goods are offered at so much per length of six or more yards and this example shows some signs of spreading. The arrangement may lead back to standard prices in the end, but a standard for six yards is not quite so confining as for a single yard. There have been times in English experience at which the arbitrary price limit has thrown not merely single fabrics, but entire ranges of fabrics entirely out of gear to the great disturbance of the owners of machinery.

* * *

Considerable interest is taken in English circles in those passages of news which tell of short-time working in the American mills. It is judged from these that a vacuum is being created in the market to fill which there will be somewhat of a rush when the final decision of the tariff-makers is made known. The point is being watched especially by wool men who are weighing up the probabilities of supply and demand with an eye to the future of prices. Mills in all departments are actively employed here and the demand for labor is so strong that wages are still rising. Cotton wages are fixed by joint agreement for long periods of time and wages in the woolen and worsted industries which have been irregular in rate hitherto are now approximating to uniformity at least in one and the same district. The wool combing trade which is confined virtually to one district now has a minimum wage of $3.48 a week for day workers (women) and $6.12 for night workers (men). These are minimum not maximum rates and the best female operatives earn their $4.80 and the best male workers their $8 now in the combing sheds. As the consequence of four or five successive advances these workers draw 30 per cent. more than they did a few years back.

* * *

It is observed that the Sydney (N. S. W.) firm which draws a subsidy from its government for carrying on wool combing contends that "it is inevitable that England must lose the trade of supplying the Eastern markets with wool tops made from Australian wool". This is perhaps as inevitable as the eventual total loss of the cotton industry to America, Egypt and India. The date is in any case some little way ahead and it is noted meantime that woolcombs still run night and day in Bradford and show a good profit on work done at 4 1/2 to 6 1/2 cents per pound on merino and about 2 1/2 to 4 1/2 cents on crossbred. Moreover they do not limit themselves to Australian wool. South American Cape and Mazamet wools can all be seen in course of blending together at the commission comber's. The owner or topmaker sends up his own sorters to the comber's warehouse where floor-space and tables are set apart for each customer to deal with his own wool as he thinks fit. The wool is tumbled through trap-doors into bins below and is removed from them by the comber's men and taken to the washing machine and to the cards and combs. The combs in Sydney run entirely for the Japanese market and now that there is serious likelihood of the imposition of a countervailing duty, equal in amount to the Australian government bounty, the continuity of the business is imperiled. Labor is too dear in Australia to give Australian tops much chance under a 15 per cent. American tariff.

* * *

It would have been well if the author of "Foreign Tariff Systems and Industrial Conditions," issued from the U. S. Department of Commerce, had observed the same scrupulosity as the Director of the British Census of Production on whose work he draws for comparing labor, power and output in the United States and the United Kingdom. That is to say that if the Department of Commerce had as carefully refrained from comparing together things which cannot reasonably be compared at all, the efficiency tables in its report would never have been presented. The comparisons of engine capacity are invalidated by this remark quoted from the British census: "Manufacturers were required to state the quantity of electricity generated by their own dynamos, but owing to the insufficiency of their records a number were unable to do so" (p. 293). If American census returns of wages paid are strictly comparable with those returns that

are taken in a limited number of establishments and at distant intervals of time by the British Board of Trade, it is absolutely certain that their reduction to "per $1,000 added by manufacture" makes nonsense of them. A prefatory remark to this table gives warning that "allowance should be made for the generally lower prices level in the United Kingdom" but it is beyond possibility to make the allowance in this higgledy-piggledy of figures.

The figures of engine capacity and number of wage earners required per $100,000 added by manufacture were cabled to an English newspaper and were received in Lancashire with laughter, bewilderment and derision. Cotton goods are bulked together in one line as though cotton goods were the same the world over. It is only necessary to remark that one part of the British cotton goods made in 1907 was 241,076,700 lbs. of cotton yarn, grey, bleached or dyed and exported. Tables which coolly pass over the disappearance from British textile industry of $77,000,000 of cottons in one incomplete stage are likely to afford surprises. Woolen and worsted goods are equally lumped together in total disregard of the disappearance of about $15,000,000 in the form of tops and about $40,000,000 in the form of yarn. Thus without going into the finer points of difference it is abundantly clear that English and American textile industry cannot be compared upon a level footing. It would not occur to the average man that all horsepower and all wages raise the value of goods equally and persons acquainted with the industry would not expect to add as much to the value of wool by combing it as by spinning, weaving and finishing it. In consequence textile England is entirely undismayed by the story of its lamentable inefficiency.

A HAND BOOK OF WEAVES

By G. H. OELSNER, Director of the Weaving School at Werdau.

Translated and Revised by Samuel S. Dale

This Series began in July, 1911

Where the warp threads float for a considerable distance on the back, they are frequently stitched by raising a warp thread over 1 pick, at a point where there is a raised thread at both the right and left of the stitched thread.

FIG. 1181.

FIG. 1182.

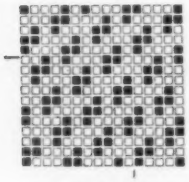


FIG. 1183.

FIG. 1184.

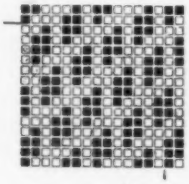
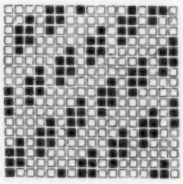


FIG 1185.

FIG. 1186.



(B) WEAVES WITH TWO THREADS ON THE FACE TO ONE ON THE BACK

To make the face closer and more compact, reform weaves are arranged to bring two threads to the face for each one on the back. They are constructed according to the following rules:

1. The pattern covers either one more or one less than three times the number of threads in the ground weave. Three twills are thus formed in one pattern.

If the weave covers one thread less than three times the ground weave, the rising number is double the number of threads in the ground weave:

For a 4-shaft twill on 11 threads, 8 picks higher, Figs. 1181 and 1182;

For a 5-shaft twill on 14 threads, 10 picks higher, Figs. 1183 and 1184;

(Copyright, 1913, by Samuel S. Dale.)

For a 6-shaft twill on 17 threads, 12 picks higher, Figs. 1185 and 1186.

If the threads in the pattern number one more than three times those in the ground weave, the rising number is one more than the number of threads in the ground weave.

For a 4-shaft twill on 13 threads, 5 picks higher, Figs. 1187 and 1188.

For a 5-shaft twill on 16 threads, 6 picks higher, Figs. 1189 and 1190.

FIG 1187

FIG. 1189

FIG 1191

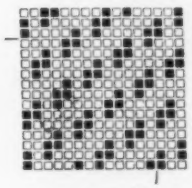


FIG 1188

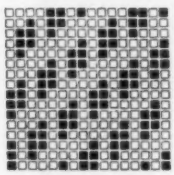


FIG. 1190

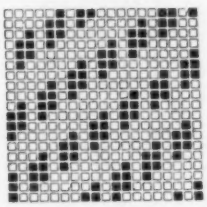


FIG. 1192

FIG. 1193

FIG. 1195

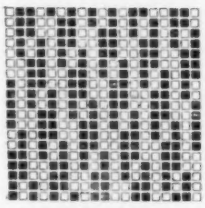


FIG 1194

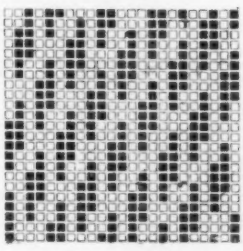


FIG. 1196

FIG. 1197

FIG. 1199

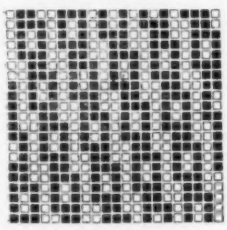


FIG. 1198

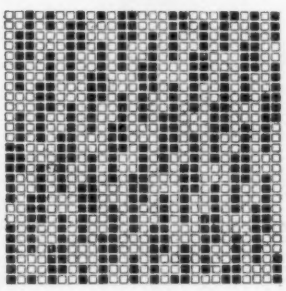


FIG. 1200

For a 6-shaft twill on 19 threads, 7 picks higher, Figs. 1191 and 1192.

2. With 2 for the rising number in a steep twill or satin weave forming the ground weave, the pattern covers either two less or two more than three times the number of threads in that weave; thus, for a 7-shaft weave, either 19 or 23 threads.

If the reform weave has two less than three times the number of threads in the ground weave, the rising number in the reform weave is double the number of threads

FIG. 1201

FIG. 1202

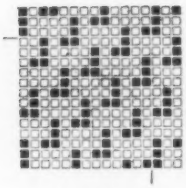


FIG. 1203

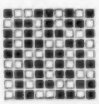


FIG. 1204

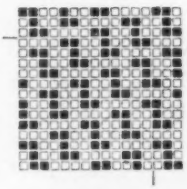


FIG. 1205

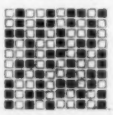


FIG. 1206

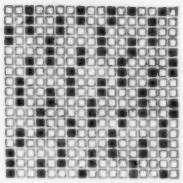


FIG. 1207

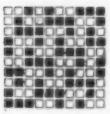


FIG. 1208

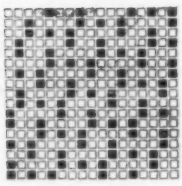


FIG. 1209

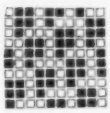


FIG. 1210

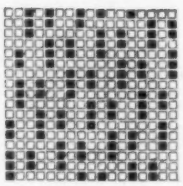


FIG. 1211

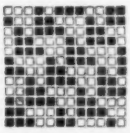


FIG. 1212

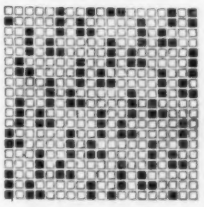


FIG. 1213

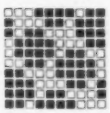


FIG. 1214

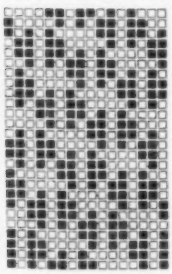


FIG. 1215

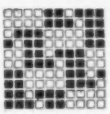


FIG. 1216

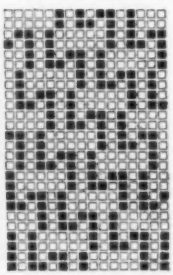
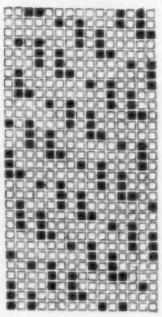


FIG. 1217

FIG. 1218



in the ground weave:

For a 7-shaft steep twill on 19 threads, 14 picks higher, Figs. 1193 and 1194.

If the reform weave has two more than three times the number of threads in the ground weave, the twill on each warp thread is set two picks more than the number of threads in the ground weave above the corresponding twill on the preceding thread:

For the same 7-shaft steep twill, Fig. 1193, on 23 threads, the twill rises 9 picks at each thread, Figs. 1195 and 1196.

3. If the ground weave is a satin with 3 for its riser, the weave will cover three less or three more than three times the number of threads in the ground weave.

If 3 threads less, the riser of a reform weave is double the ground weave, Fig. 1198, rising 16 picks, being a 21-thread reform weave with the 8-shaft steep twill, Fig 1197, as a base weave.

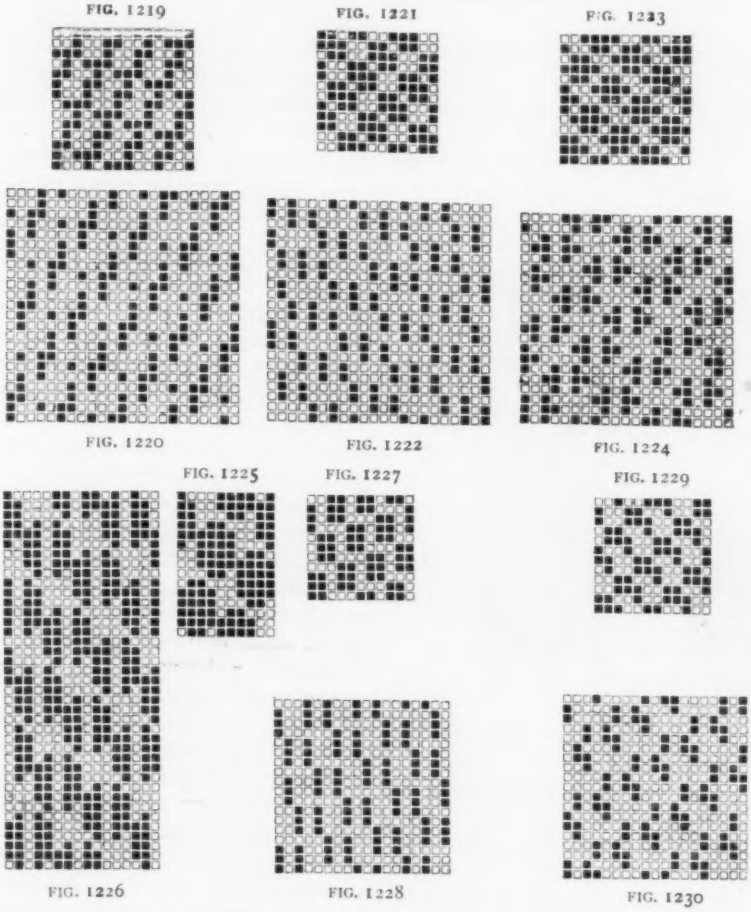


FIG. 1219 FIG. 1221 FIG. 1223

FIG. 1220 FIG. 1222 FIG. 1224

FIG. 1225 FIG. 1227 FIG. 1229

FIG. 1226 FIG. 1228 FIG. 1230

If 3 threads more, the riser of the reform weave is 3 more than the number of threads in the base weave. Fig. 1200, rising 11 picks, is a 27-thread reform weave with the same 8-shaft steep twill, Fig. 1197, as a base, Fig. 1199. Reform weaves can be so constructed that each thread forms three or four twills before passing to the back. Figs. 1201 to 1230 illustrate additional forms of these weaves.

Fig. 1201, 8 threads weave on 13 threads. Fig. 1202.

Fig. 1203, 9 thread weave on 13 threads, Fig. 1204.

Fig. 1205, 10 thread weave on 17 threads, Fig. 1206.

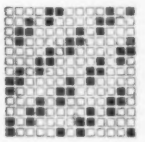
Fig. 1207, 10 thread weave on 17 threads, Fig. 1208.

Fig. 1209, 10 thread weave on 17 threads, Fig. 1210.

Fig. 1211, 13 thread weave on 19 threads, Fig. 1212.

Fig. 1213, 10 thread weave on 13 x 26 threads, Fig. 1214.

FIG. 1231



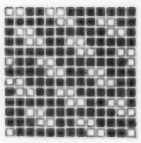


FIG. 1233

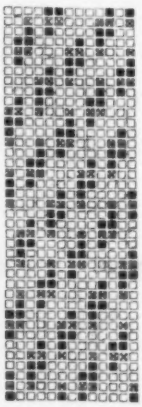


FIG. 1232

Fig. 1215, 10 thread weave on 13 x 26 threads, Fig. 1216.

Fig. 1217, 8 thread weave on 15 x 30 threads, Fig. 1218.

Fig. 1219, 14 thread weave on 23 threads, Fig. 1220.

Fig. 1221, 12 thread weave on 22 threads, Fig. 1222.

Fig. 1223, 13 thread weave on 21 threads, Fig. 1224.

Fig. 1225, 10 x 15 thread weave on 13 x 39 threads, Fig. 1226.

Fig. 1227, 11 thread weave on 18 threads, Fig. 1228.

Fig. 1229, 12 thread weave on 19 threads, Fig. 1230.

(c) REFORM WEAVES WITH STUFFING PICKS

It is frequently necessary to increase the weight of cloths made with reform weaves by introducing extra filling threads, called stuffing picks, which do not show on either side of the fabric. For these extra picks all the warp threads are raised that are raised before and after the stuffing pick, and the threads are lowered that are floating on the back at this place. Fig. 1232 shows a stuffing pick introduced after every two picks in the weave shown at Fig. 1231. The filling is woven: 2 regular picks, 1 stuffing pick.

THE VALUE OF COMMERCIAL STARCHES FOR COTTON MILL PURPOSES

BY G. M. MacNIDER

From the Journal of the Elisha Mitchell Scientific Society

The value of starch for cotton mill purposes depends on its property of swelling and forming a viscous solution when treated with hot water. It is well known in practice that the different starches produce different effects in sizing and finishing. One kind of starch will penetrate the goods better than another. This variation is due to a difference in the thickness of the solutions formed by the different starches when boiled with water, that is, one starch forms a more viscous solution than another. The thickness or viscosity of the solution formed by starch is the most important point to be known in determining the value of a starch for textile purposes, for on this depends the penetration of the starch solution into the yarn or cloth, and hence the stiffness which will be given to the goods when sized or finished. As the viscosity of the starch solution is such a valuable indication of the value of the starch it is very important to have a method for determining the viscosity which will give results comparable to actual practice. The following method has been devised for this purpose:

Twelve grams of the starch are weighed into a 600 cc. beaker, 300 cc. distilled water added (thus making a 4 per cent. solution) and heated with constant stirring to the boiling point and boiled for ten minutes; 200 cc. of this solution are then poured into the cup of a Scott viscosimeter, the temperature allowed to become constant, usually 94° C., and 50 cc. run out into a graduate, the time being accurately measured with a stop watch. The number of seconds required to

deliver 50 cc. of the solution divided by the number of seconds required to deliver 50 cc. of boiling water gives the viscosity.

It will be noticed from this that the starch solution is prepared by boiling with water as is done in sizing and finishing and the viscosity is measured at very near the boiling point of the solution, so that the figures obtained show the effect of boiling on the different starches. The viscosities of the principal commercial starches are shown in the following table:

TABLE I.—VISCOSITIES OF COMMERCIAL STARCHES

(12 grams starch in 300 cc. water, boiled ten minutes)

Starch	Viscosity
Corn	3.05
Potato	14.31
Cassava	3.92
Sago	1.57
Wheat	1.25
Rice	1.00

From the above table it is seen that there is a wide variation in the viscosities of the different starches and hence a wide variation in their value for mill purposes. The viscosity of potato starch is much higher than that of any other starch, but there is also a considerable variation between the viscosities of the other starches. The importance of the viscosity will be seen more fully in the next section in showing the effect of boiling on the viscosity of starch solutions. It has been found that there is frequenlty considerable variation in the viscosities of different lots of the same kind of starch. It would be very advantageous to the mills for each lot of the same kind of starch to have a uniform viscosity. This would make it possible to obtain the same results in sizing and finishing without changing the formula for each lot of starch.

In practice the starch solution is boiled from thirty minutes to one hour before being used. It is therefore very important to know the effect produced by boiling on the viscosity of the starch solution. This is shown in the following table:

TABLE II.—SHOWING THE EFFECT OF BOILING ON THE VISCOSITIES OF COMMERCIAL STARCHES

(12 grams starch in 300 cc. water)

Starch	Minutes Boiled	Viscosity
Corn	at boil	2.15
"	10	2.73
"	20	4.26
"	30	7.00
Potato	at boil	16.37
"	5	19.51
"	10	14.31
"	30	6.33
Cassava	at boil	9.93
"	5	4.53
"	10	3.88
"	20	3.91
"	30	4.17
Sago	at boil	1.88
"	5	1.62
"	10	1.57
"	30	1.66
Wheat	at boil	1.20
"	5	1.22
"	10	1.26
"	20	1.24
"	30	1.33
Rice	at boil	1.00
"	10	1.00
"	30	1.08

From the above table it will be seen that the viscosity of corn starch increases uniformly with the length of time of boiling. This increase is about what would be expected with the concentration of the solution when there is no change in the starch. This is a very valuable property of corn starch as compared with other starches and gives corn starch a much wider application in the textile industry than any other starch. The value of this property will be seen more clearly by comparison with potato starch.

Potato starch reaches its maximum viscosity after being boiled five minutes. From this point the viscosity decreases rapidly with the increase in time of boiling, the concentration of the solution apparently having no effect on the viscosity. After boiling ten minutes potato starch has a viscosity slightly more than five times as great as corn starch, while after boiling thirty minutes the viscosity of potato starch is less than that of corn starch which has been boiled the same length of time. This property of potato starch of liquefying on boiling is a very important point to be considered in using this starch. In sizing the starch is boiled from thirty minutes to one hour before being used, hence, as will be seen from the table, a size mixture made of potato starch will have a viscosity less than that of a similar size made of corn starch at the time it is ready to be applied to the yarn. In other words, the potato starch size will not be as

valuable for sizing as the corn starch size, but it will cost approximately twice as much as the size made from corn starch.

Cassava starch attains its maximum viscosity at the boiling point. The solution apparently has a higher viscosity shortly after complete gelatinization takes place, but no measurements were made of this as the starch is not used until it has been boiled. After reaching the boiling point the viscosity decreases uniformly with the length of time of boiling. After boiling thirty minutes there is an increase in the viscosity over that of the solution boiled twenty minutes. This increase is probably due to increase in concentration. As will be seen from the table, cassava starch behaves in a manner very similar to potato starch as regards liquefaction of the solution, but not to the same extent. Cassava starch therefore has a much broader application in sizing and finishing than potato starch.

Sago starch has a much lower viscosity than any of the starches so far considered. Like cassava starch it apparently has a higher viscosity at the time of complete gelatinization, but no measurements were made of this. The viscosity is highest at the boiling point and decreases uniformly on boiling, though not to the same extent as the other starches. After boiling thirty minutes there is a slight increase in viscosity due to the concentration of the solution. While having a considerable lower viscosity sago starch is quite similar to cassava starch as regards the effect of boiling on the solution.

Wheat starch shows a gradual increase in viscosity with the time of boiling, similar to corn starch, though the total increase is small, the viscosity of the thirty minute determination being only slightly higher than the determination made at the boiling point. Rice starch has the same viscosity as water when measured under these conditions. At the end of thirty minutes boiling it shows only a very slight increase in viscosity. The marked differences in the effect of boiling on the viscosities of the different starches is due to the fact that some starches form soluble starch products more readily than others. The data given in the preceding table shows very plainly the importance of the viscosity in determining the value of a starch for mill purposes.

SPECIAL OR TREATED STARCHES

A number of special starches are now used which have been treated so as to make them "thin boiling starches," that is, when boiled the solution has a lower viscosity than the natural starches. These usually consist of corn starch which has been treated in some way to reduce the viscosity. The viscosities of several such starches are shown in the following table:

TABLE III.—VISCOSITIES OF SPECIAL OR TREATED STARCHES

(12 grams starch in 300 cc. water, boiled ten minutes)

Starch	Viscosity
Eagle Finishing	1.15
N Starch alkaline	2.13
Famous N	1.17
Erkenbrecher's Modified	1.13
T. B. Crystal No. 75	1.11
T. B. Crystal No. 90	1.04
Special Warp Sizing	3.48

There are quite a number of processes for treating starches to reduce the viscosity or make them thin boiling starches. In the table above the Eagle finishing starch is a treated starch containing a small amount of borax and is slightly alkaline. The viscosity of the alkaline N starch has been reduced by the addition of a small amount of alkali. The other starches given in the table have been treated to reduce the viscosity and are neutral in reaction. The effect of several reagents on the viscosity of starches has been shown in a previous paper.

It will be seen from this table that the viscosities of the treated starches cover quite a wide range, from a viscosity slightly less than that of corn starch to a viscosity only slightly higher than water. The special warp sizing starch is a pulverized corn starch. It is frequently claimed that pulverized starch makes a smoother size mixture than the ordinary granular starch. These treated starches, on account of having lower viscosities than untreated starches, are of value in sizing and finishing to obtain more penetration of the starch into the yarn or cloth and to increase the amount of starch

which is put into the goods. This may be accomplished by using the treated starch in place of the untreated and increasing the amount used or by mixing the treated starch with the untreated starch in such proportion as to secure the desired results. For instance, in sizing or finishing if the mixture contains 50 lbs. of corn starch to 100 gallons of water and it is desired to increase the amount of starch put into the goods nearly double this amount of a thin boiling starch could be used which has a viscosity of half of that of corn starch and still obtain a size mixture with the same thickness or viscosity as with the 50 lbs. of corn starch. In other words, nearly twice as much starch would be put into the yarn, thereby increasing the weight of the yarn, by using the thin boiling starch than by using the untreated corn starch. This is shown in the following formula for sizing No. 26 yarns which are taken from actual practice:

100 gallons water.
50 lbs. corn starch.

100 gallons water.
95 lbs. Eagle finishing starch.

It will be noted from the table of viscosities that Eagle finishing starch has a viscosity slightly less than half of that of untreated corn starch and hence when this starch is used the amount can be nearly doubled without effecting the penetration.

By comparing the following formula for sizing No. 26 yarns with the first formula given it will be seen how the amount of starch may be increased and at the same time obtain greater penetration and more weight than with untreated corn starch.

100 gallons water.
80 lbs. Eagle finishing starch.

The following formula for sizing No. 26 yarns shows the use of another treated starch:

100 gallons water.
65 lbs. alkaline N starch.

It will be noted from the table of viscosities that this starch has a viscosity of 2.13 or slightly lower than corn starch and hence a larger amount of it can be used.

In making investigations on the value of the different commercial starches for cotton mill purposes the author has received very valuable assistance from many of the cotton mills in the State. A large number of mills have very kindly sent in reports showing the kind of starch which they use and the method of preparing the starch for sizing and finishing. Below are given a number of typical formula for sizing by the long chain or slasher system which are in actual use by the mills. For convenience of comparison the formula have been calculated to a basis of 100 gallons of water. As there is such a great variety of softening agents in general use by the mills the amount of softener has not been included in the formula. The average amount of softener used in sizing is approximately 15 lbs. of tallow, or its equivalent, to 100 lbs. of starch or 1.5 lbs. to each 10 lbs. of starch. The amount used varies, of course, with the yarn numbers and the method of sizing.

For yarn Nos. 14s and 20s.
100 gallons water.
66 lbs. Eagle finishing starch.

For yarn Nos. 14s and 22s.
100 gallons water.
71 lbs. Eagle finishing starch.

These formula are used on practically the same yarn numbers. The first one, using 66 lbs. of starch will give greater penetration than the second, but the second formula will give more weight to the yarn.

For yarn No. 16.
100 gallons water.
63 lbs. corn starch.

In this formula, using an untreated starch, a smaller quantity of starch is used than in the other formula where treated starch is used.

For yarn No. 21.
100 gallons water.
62 lbs. corn starch.

For yarn No. 23.
100 gallons water.
60 lbs. corn starch.

For yarn No. 26.
100 gallons water.
50 lbs. corn starch.

100 gallons water.
95 lbs. Eagle finishing starch.
100 gallons water.
80 lbs. Eagle finishing starch.
100 gallons water.
65 lbs. Alkaline N starch.

These formula for 26s show how different starches may be used to increase the penetration and vary the amount of starch put into the yarn, thereby increasing the weight of the yarn.

For yarn Nos. 28s and 36s.
100 gallons water.
65 lbs. potato starch.

For yarn No. 28 1/2.
100 gallons water.
80 lbs. Famous N starch.

For yarn No. 30.
100 gallons water.
65 lbs. Famous N Starch.
100 gallons water.
65 lbs. corn starch.

These formula for 30s show how more penetration and hence more weight may be obtained by using a thin boiling starch in place of an untreated starch.

For yarn No. 36.
100 gallons water.
48 lbs. potato starch.

For yarn No. 40.
100 gallons water.
65 lbs. Eagle finishing starch.
100 gallons water.
70 lbs. potato starch.

In comparing the amounts of starch used in the different formula the viscosity of the different starches should be kept in mind as it will be noted that when large amounts of starch are used the treated or thin boiling starches are used in place of the untreated starch which has a higher viscosity.

In sizing by the short chain system more starch is required and a thicker solution is used than in sizing by the long chain or slasher system. This is due to the fact that the yarn is not stretched as much in short chain sizing as it is on the slashing machine and hence the starch solution penetrates the yarn more readily. For example, a size mixture composed of 120 gallons of water, 65 lbs. of starch and 8 lbs. of tallow will size about 720 lbs. of No. 14 1/2 yarn by the short chain system, while by the slasher system the same amount of size will be sufficient for about 950 lbs. of the same yarn.

In preparing the starch for use it is very important that the size be thoroughly boiled before being used. In the reports which the author has received from the cotton mills it is always recommended to boil the size mixture from thirty minutes to one hour before using. From this it is safe to say that the size mixture should be boiled for not less than forty-five minutes before being used.

From the data which has been presented in this article it is seen that the viscosity of the starch solution is the important point to be considered in determining the value of a starch for textile purposes. There is another property of starch which is of value in the textile industry which is not shown by the viscosity, that is the finish which is imparted to the goods by the starch. Potato and cassava starch are said to produce a smooth finish, while corn and rice starch are said to produce a harsh finish. While this property may be of value in sizing and finishing some grades of goods, still no matter which one of the starches is used some softening agent must be used with it to modify the effect of the starch and it is therefore best in the majority of cases to use a cheap starch and control the finish by the use of softeners than to control the finish by varying the kind of starch used.

Sufficient data has been given to show the value of the different starches for textile purposes. There is a wide variation in the viscosity of the different starches and in the effect of boiling on the viscosities and as this is such an important factor in sizing and finishing it must be taken into consideration in selecting the starch to be used in cotton mills. As starch plays such an important part in the manufacture of cotton goods it is very important for the manufacturer to use the kind of starch which will produce the desired results most economically.

The samples of treated starches were furnished the author by the Corn Products Refining Co, New York.

Questions and Answers

Under this head we undertake to answer, free of charge, to the best of our ability, questions pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

If the question is not of general interest to textile readers and involves expensive investigation, a charge covering the cost may be made, of which the inquirer will be advised before any expense is incurred.

IMITATION FUR

Editor Textile World Record:

Enclosed is a sample of imitation civet cat fur. Kindly let me know how it is made, and more especially how it is printed. Atwood (2204).

We forwarded this inquiry to our French correspondent who replies as follows:

The sample submitted presents no special difficulty in weaving, the characteristic effect of the fur being obtained in the finishing process. The fabric has a cotton warp and mohair filling, set 25 threads to the inch. The filling is carded mohair with 22 picks per inch. Both warp and filling are woven in

CIVET CAT FUR

the grey with a broken 4-leaf twill. After weaving the cloth is passed through hot water, 176° F., then soaped at 100° to 115° F., with a small quantity of carbonate of soda or ammonia added to the soap bath. The goods are then rinsed thoroughly in soft water and hydro-extracted. The cloth is next treated with chlorine, this operation being of great importance as on it the brightness of the colors depends. If done properly it increases the affinity of the wool for the dyestuff without injuring the white. If the chlorine bath is too strong the white becomes yellow by steaming.

The passage of the goods through the chlorine bath occupies 40 to 50 seconds and is repeated if the bath is not concentrated. The cloth is then rinsed until it does not blue paper that has been soaked in Congo red. The fabric is bleached by immersing in a bisulphite solution at 8° to 10° Be. for 12 to 24 hours, and is then passed through a solution of water and silitate of soda made up as follows:

Peroxide of hydrogen, 10 vols, 24 parts by weight
Silitate of soda, 20° Be. ..... 6 parts
Water .....70 parts

The cloth is rolled and left for 12 hours, then rinsed in water. It is necessary to use soft water in order to prevent the white from turning yellow.

The fabric is now passed through a solution of stanate of tin at 3° to 6° Be., the tin mordant being fixed by a rapid passage through sulphuric acid at 1° Be., which is followed by rinsing and drying. The cloth is printed with rollers which are cut very deep. This process is not out of the ordinary, but owing to the white portions of the pattern it is necessary to reduce the time during which the goods are steamed after printing. Owing to this fact it is necessary to use a black dye which does not require long steaming. After this operation the cloth is rinsed and then soaped. The damp goods are then napped on face and back. When coming from the napping machine the back of the fabric passes over a tube heated by steam which softens the goods. The cloth is next passed under a revolving porcupine cylinder in which needles are thickly set, to raise the nap. This porcupine roller turns in the opposite direction to that in which the fabric is moving. Ordinarily the cloth is run two or three times over the porcupine roller

and is then taken to the shearing machine. After cropping the nap is again raised on the porcupine roller and sheared again. The fabric is immersed in boiling water and wound under a very high tension on wooden rollers. As the cloth passes to the rollers it goes over a revolving brush which sets the nap in the desired direction. The roll of cloth is wrapped firmly with a cotton covering, set vertically in boiling water and left as long as it is necessary in order to set the pile. Gaul.

MANUFACTURING KNITTED NECKWEAR

Editor Textile World Record:

Please inform me what the minimum cost would be of starting the manufacture of fancy knitted neckwear on a small scale? Also what would the raw material cost? Duxbury (2186).

The cheapest grade of knitted neckwear is made from fiber or wood silk on circular machines, one and three-quarters inches in diameter, forty-nine needles and 12 gauge.

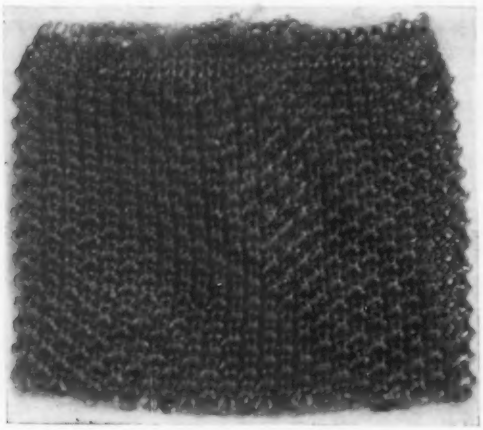


FIG. 1. MADE ON A CIRCULAR MACHINE OUT OF FIBER SILK

These machines were operated at first by firms engaged in the manufacture of braids because wood or fiber silk is used in manufacturing these goods and their plants were equipped with skein winders and doublers. A mill to manufacture neckwear exclusively can purchase the silk already wound on cones with the desired number of ends, but this makes the cost of production considerably higher than if a mill wound the silk. To do this a skein winder is required containing as many spindles as there are machines.

Silk yarn can be purchased before dyeing and made either with single end or as many ends as needed to make the necktie. These are dyed whatever colors are required and wound from skeins on small spools. As these spools will not run satisfactorily on the machines it is necessary to have a cone winder with as many spindles as may be needed and then wind the silk from the small cones on paper cones. In this way there will be no trouble in making perfect neckwear. Silk

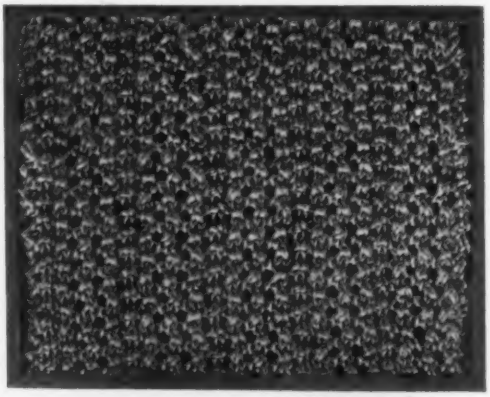


FIG. 2. MADE ON A GERMAN CROCHET MACHINE

yarn varies in weight according to the different colors. To overcome this difficulty a combined twister and doubler is used. The silk yarn in one end is dyed the colors needed. The silk is wound on the skein winders and can be wound on the twister and doubler with as many ends as required to get the desired weight. The yarn is wound from this machine on paper cones. If some of the colors do not come up heavy enough, one end can always be added to the cone. As much as there are a number of places to receive the cones a one end cone can be wound and knit into the fabric along with the required number of ends.

Another good machine is the regular hosiery ribber, 2 1/2 inch diam., 36 gauge. It is equipped to make accordion neckwear with cross strips of two colors on each feed, and produces on an average five dozen a day.

After making neckties on these circular machines the next operations are finishing of the ends, pressing, etc. A sewing machine can be purchased to sew up the ends of the neckties. A one section sewing machine table will be required for the machine. One machine will finish the ends of at least fifty dozen ties a day with one girl running it and another girl pulling in the ends that are left ragged after sewing. An apparatus must be provided for seaming the ties. All that is

FIG. 3. MADE ON A GERMAN ACCORDION MACHINE

required is to connect the steamer to a brass cylinder made about three inches in diameter and about nine inches wide with two slots of two inches each for the steam. Pass the tie over the steam until the finish is satisfactory. The next operation is the folding and boxing.

The flat hand machines constructed to produce sweaters were made into a finer gauge and made to produce a fine accordion necktie with a vast variety of stripes and stitches. The front bed of needles is so constructed as to move over one needle at a time for four times and then back again one at a time. This work and various other stitches enables a knitter to produce some very fancy stripes. As these ties are made in a wide flat piece it is necessary to sew up a seam the whole length of the back. A sewing machine must be purchased to do this work. The ends are finished on the machine used to finish the ends on the circular machine and are steamed in the same way as the other ties.

There is also an English hand frame machine, of which there are quite a few in this country, on which the high priced crochet neckwear is made. These machines are operated by hand and foot, the operator sitting in front. The production from one machine is only 1 1/2 dozen a day, making the goods rather expensive. As they crochet knit instead of accordion they cannot be finished on the same machine, but girls must be employed to sew up the back seam and also sew up the ends, one girl doing on an average of two dozen a day. There is a German machine that produces the same effect as the English, but which runs by power and makes twelve neckties at one time and about six dozen a day. There is also another German neckwear machine which makes the accordion neckties and is equipped with six carriers to carry six different colors of silk. It can make a vast variety of stripes and colors, and can produce sixteen neckties at one time with a production of about seven dozen a day. Laramie.

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BLEACHING SHORT LENGTHS

Editor Textile World Record:

Can you give us some information on the subject of finishing small samples of cotton goods, say from half a yard to about two yards, cut from original sample pieces? If we could find some arrangement whereby we could, in a small way, mercerize, bleach and dye these small ends here, we would thank you to let us know.

Columbis (2208).

I am unaware of any method of testing short lengths in different finishes otherwise than by stitching the length to the tail of goods undergoing the same finish. To my knowledge new finishes on such goods as linings are often obtained only at an appalling expense in spoiled goods. Regent.

SHRINKAGE IN DYEING AND BLEACHING YARNS

Editor Textile World Record:

Can you give us some information regarding the shrinkage and loss of weight in dyeing and bleaching cotton and worsted yarns? Should there, if the proper dyeing processes are used, be any loss in the weight of cotton? We would appreciate it if you could enlighten us somewhat on the experience of users along these lines and explain the reason for any loss that may occur.

Columbus (2155).

Cotton generally loses up to 7 per cent. of its weight, but this figure is not to be taken as applying to all cottons, some of which lose more than others. Unbleached cotton seldom loses during dyeing more than 3 or 4 per cent. of its actual weight, but this is offset by a certain quantity of color that is taken up from the dye bath.

Few results are recorded giving the exact figures of losses, and those that are made public are somewhat unreliable because they do not allow for the normal content of moisture contained in the goods.

Worsted loses only the natural suint that is normal to the wool, and also the oils that are added to it during the manufacturing process, and which should be all removed by the scouring. During dyeing wool seldom loses in weight if it has been properly scoured.

Berwick.

In the dyeing of cotton yarns which have not been bleached the loss in weight will depend considerably on the nature and class of dyestuff employed. In the case of the usual substantive cotton colors there will be a loss in weight of from 1 to 4 per cent. This is explained by the fact that in the boiling-out and wetting-out of the cotton yarn a good deal of the adhering wax and resinous matters on the fiber is removed. In the general run of cotton yarns this, if completely removed, would amount to about 5 per cent. in weight. As a rule, however, in the mere dyeing of raw cotton yarns the removal of these matters is incomplete, and furthermore there is a slight accession of weight due to the amount of dyestuff which is taken up by the fiber, together with some of the salt used in the dye bath. It is seldom, however, that the loss in weight of dyeing raw cotton amounts to more than 4 per cent. Naturally it can be understood that a heavy dyed color should cause less loss in weight than a light tint, as the amount of dyestuff taken up is far different.

In dyeing a heavy shade, especially black on cotton, the fiber may absorb 2 or 3 per cent. of its weight of dyestuff; whereas in dyeing light shades and delicate tints only one-tenth of the per cent. of dyestuff may be absorbed. This weight of absorbed dyestuff subtracted from the general loss in weight due to the removal of the natural impurities in the fiber by the boiling water will give the actual loss of weight. In the case of bleached yarns the loss will depend to a considerable extent on the degree of bleaching. In the case of a bleach intended for white goods where a very thorough boiling-out and bleaching operation must be carried out, the loss will be from 5 to 7 per cent. This is frequently cut down somewhat in the case of cotton already bleached by softening the yarn. In such a case the fiber will take up a small amount of softener, which includes various vegetable oils and soaps, and consequently the apparent loss in weight is not as high as if it were bleached without the use of the softener. This, however, is not very large and is seldom more than 1 per cent. of the weight of the cotton. In the case of cotton cloth the weight of the finished article will depend very largely, of course, on the degree and character of finishing materials and stiffening agents added to the cloth after bleaching. If, however, the pure fiber alone is taken as a basis, the loss of weight in bleaching will be about 5 per cent. It must be borne in mind, however, that calculations on such a basis are seldom feasible in the case of cloth, owing to the fact that in the weaving of the cloth the warp yarns are generally dressed or sized to a considerable degree with starch or other materials so that the weight of the pure fiber has been changed. In the subsequent boiling-out and bleaching operations these dressing and sizing ingredients are removed from the cloth and consequently the pure unfinished bleached cloth might show a very considerable loss in weight, much more than would be represented by the actual loss due to the removal of the natural impurities on the fiber.

In dyeing cotton yarns with other than the substantive dyestuffs there may be times when instead of a loss in weight there is an actual gain experienced. This is sometimes true of dyeing sulphur blacks or other sulphur colors on cotton where enough of the dyestuff is taken up by the fiber to overbalance the loss caused by the removal of the waxy and resinous matters in the fiber. Under such conditions there may be an increase in weight of the dyed goods to as much as 4 or 5 per cent. Also in the case of basic dyes on cotton there may be an increase in weight where tannin-antimony or tannin-iron mordant is employed in connection with the actual coloring matter. If heavy shades are used there will sometimes be an increase in weight insead of a loss and even under ordinary circumstances where medium or even light shades are employed there will seldom be an actual loss of weight experienced in the dyeing. This is due to the fact that the addition of the tannin and metallic salt, together with the quantity of dyestuff absorbed, is sufficient to counterbalance the loss of the weight due to the removal of the natural impurities on the fiber.

With worsted yarns the loss in weight experienced by dyeing and bleaching will vary widely, depending on the amount of oil and impurities present in the worsted yarn. In the case of Bradford spun worsted yarn there may be a loss experienced in scouring the yarn which will amount to as much as 6 or 10 per cent. This loss represents the oil emulsion which is used for the purpose of lubricating the fibers in the spinning operations, and also includes the miscellaneous dirt and impurities collected by the fiber during its process through the various manufacturing operations. Some worsted yarns of a high class are very clean and about the only loss experienced in the scouring is that due to the oils which have been added. In the case of French spun worsted yarn there is little or no oil added to facilitate the spinning operation. Consequently the loss in scouring will seldom be more than 2 to 4 per cent. From these losses in scouring must be deducted the weight added to the yarn in dyeing by the absorption of the various mordants and dyes which may be employed. In the case of acid colors, the amount of absorption of course will naturally depend on the depth of shade desired. Heavy shades may take up as much as 2 to 3 per cent. in weight of dyestuff and this varies down to a very small increase in the case of light shades. Where the yarn is mordanted with chrome or other metallic salts there is a further addition of weight amounting to as much as 1 to 2 per cent. No general rule of loss in weight can be given under these circumstances without knowing the particular conditions of operation, but it may be stated as a general fact that worsted yarns will lose from 2 to 6 per cent. in dyeing. This of course including the loss of scouring, which operation must naturally precede the dyeing.

J. M. Matthews.

ESTIMATING COST OF HOSIERY

Editor Textile World Record:

I would like to have an explanation as to how the cost of hosiery is estimated in a mill buying the yarn. Knitter (2209).

It is usually the custom for a manufacturer starting in business, especially the manufacturing business, to inquire of some practical man how he figures his cost. This is an important point. In hosiery manufacture the first question is, what will the yarn cost? All yarns are as a rule quoted f. o. b. destination, consequently there is no freight to be added. Under head of mill expenses are included heat, light, rent, interest on capital, insurance, stationery, office help, salaries, fixed wages, repairs, etc. This expense will vary according to the production and locality. Following are the items of cost:

Yarn, weight per dozen,
Waste,
Knitting,
Inspecting,
Mending,
Lopping,
Dyeing,
Boarding and pressing,
Pairing, folding, stamping and boxing.

Paper boxes,
Seconds,
Mill expenses,
Packing cases,
Commissions,
Discounts.

Such items as knitting, looping, inspecting, mending, pairing and folding are usually piece work and paid by the dozen. The price varies according to location and competition, and prices will have to be arranged as conditions demand. Garhwal.

MANUFACTURING A SHAKER SWEATER

Editor Textile World Record:

I am sending you a shaker sweater. Please examine and let me know the kind of a machine that was used in finishing it. How is it joined at the shoulder, how are the pockets knit in and the facing put on? Wyoming (2196).

I should say this sweater was made of 5 ends of 2/16s or 2/18s worsted yarn knit on 2 1/2 or 3 needles to the inch either on a Grosser or Dubied machine. The shoulders were closed on the machine. This is done by setting the machine on the rib stitch and knitting about 3 courses on the needles. Then set the cams so that they will knit one course of very loose stitches. Then set the cams on the back side of the machine so that they will not draw any stitch to cast it off the needles. The front cams are set so they draw very short and cast off. The operator then pulls the needles down on the back of the machine so they will cast off. As there is nothing holding the front needles the stitch will be drawn up even on both sides which will form the shoulder stitch. Set the cams for the regular stitch and knit 60 turns which is down to the length of the armhole needed. The cams must now be changed again for tubular work, taking off one carrier that was used to make the open armhole. Start the machine and let it run until it has knit 90 revolutions, when the chain must be set so that the machine will stop automatically. Count in 10 needles from the center of the sweater on front of machine and push up 20 needles. Lay 2/10s mercerized across the needles and knit off one needle at a time until the cotton is knit on to the 20 needles. Then do the same on the opposite side of the center. When this is done start the machine up and finish the sweater. This cotton thread is used for a draw thread. When the pockets are put in, pull the thread out and then knit the pockets together by hand. This is the only way to put pockets into a hand finished sweater. The sleeves in this sweater were knit by hand and the cuffs were knit to the sleeves in the same way. The hem was turned up and knit together by hand. The button hole

A SHAKER SWEATER

and button strip were sewed on with either a Union special sewing machine or a Metropolitan machine which has an attachment for this kind of work. The seams were covered with a twin needle covering machine. The Merrow Machine Co. have just put a machine on the market that will do the sewing and covering in one operation. The button holes were made on a Reece button hole machine or a Singer machine. The buttons were sewed on by hand. Delmar.

Knitting Department

THE KNIT GOODS SITUATION

At the present writing orders for underwear for spring of 1914 delivery are being placed in a very generous manner. The New York Knit Goods Association has settled upon June 9th for an opening date, but it has been since learned that many manufacturers and agents had taken orders before that time. Some makers are sold up for the year and quite a number claim to have at least two-thirds of their output under contract.

It was confidently expected that the opening prices on the spring line would be at least equal to those at which most lines have been sold during the past three months. This would be an advance of about 5 per cent. over the prices that were named in June, 1912, but so far as we are able to learn, almost without exception, manufacturers have taken orders at last year's original prices, although there is every reason to believe that advances could have been obtained if asked, as in the case of the hosiery end where prices ranging from 2 1/2 to 5 cents per dozen higher than last year have been obtained and several mills sold up in record time at that.

The large majority of the buyers who have been in the market, as well as those who have been placing their orders with the travelers on the road, have operated very freely. Prices on some lines of men's 25 cent balbriggans have been named at 2 1/2 cents per dozen less than last year's quotation. There is, of course, a gambler's chance that cotton may decline so as to permit these manufacturers to make a profit, but it seems unwise to take chances of sacrificing results.

Some of the makers of 25 cent balbriggans located in the Western New York State have started with 4 pound weight at $1.67 1/2, and several lines weighing 4 to 4 1/2 pounds are being quoted at $1.70 to $1.75, while 5 pound goods with outside band drawers may be had at $1.85.

The Diana Knitting Co. have a line of men's balbriggans, weighing 4 1/2 pounds with rib tail on the shirt and back strap on the drawers at $1.85. This same concern also has a line of boy's balbriggan shirts and drawers at $1.50 on which some liberal orders have been placed.

The Rome Knitting Co. show a line of 6 pound balbriggans at $2.50, made of carded yarn; also a line of combed goods, weighing 4 3/4 to 5 pounds at $3.00.

The Lawrence Mfg. Co.'s line shown by E. M. Townsend & Co. embraces a wide variety of different fabrics and finishes, and combed lines, weighing from 4 3/4 to 5 pounds are being shown at $3.05 and up. A very attractive line is shown by this concern at $3.50, weighing 6 pounds.

The Ford Mfg. Co., of Waterford, N. Y., are offering their 5 pound line of combed goods at $3.25; also the same fabric with looped-on ribbed tail shirt at $3.50, and at this same price, show a 6 pound combed line with hem tail on the shirts and horn button on the drawers. They also loop the tail on the shirt of this 6 pound garment at $3.75 and put pearl buttons on the drawers at $3.62 1/2.

The Morris Mills have announced that their production was sold up for the year before their representatives had an opportunity to call on all of their regular trade. Their principal line of light weights consists of men's carded balbriggans at $1.85, weighing 4 1/2 pounds. One important feature mentioned in regard to this line is that it has combed yarn cuffs and anklets. This concern has discontinued making this line of carded ribbed shirts and drawers at $1.85, but are increasing their production of combination suits made of the same cloth and for which they get $3.50.

The Canasawacta Knitting Co. are also showing a line of men's suits made from a ribbed fabric in ecru and white at $3.50.

The Royal Gem Mills of St. Johnsville, N. Y., have a similar line at the same price and

some very liberal orders are coming forward on all of these 50 cent grades of men's suits. They are all made with set-in shoulder pieces and the consumer, buying one of these garments at 50 cents, certainly gets good value.

Some selling agents among the Western trade in particular, state there is very little demand for two piece underwear, the call being almost entirely for combination suits for men, women and children.

A change in the distributing policy of two manufacturers who have heretofore sent a large production through the hands of regular jobbers, is causing some extra activity in the market. It is understood that the Cooper Mfg. Co. of Bennington, Vt., have sold their entire production of light weight goods to one concern, namely, Wilson Brothers of Chicago, and as a result of this, several manufacturers who have spring needle machines, are making an extra effort to place their lines with those buyers who will be unable to get Cooper's goods.

The Roxford Knitting Co. of Philadelphia have adopted the policy of selling their goods direct to the retail trade and have established a depot in Chicago where they expect to carry stock to take care of the Western retailers' needs during the season.

The representatives of the Porosknit Company have visited the majority of their customers and it is said their early orders are about 70 per cent. greater than from the same trade last year. They have recently completed a large and up to date mill in Amsterdam and for the coming year, have adopted a plan, giving cash prizes for the most unique window displays of their merchandise. This is a particularly interesting plan from the fact that they not only give cash prizes to the window trimmer, but to the buyer and salesman of the goods that go in the window that win prizes.

The Lawrence Mfg. Co. and Chalmers Knitting Co. have both adopted a new "Adjusta" slide for their drawers for the coming season. This is an adjustment attached to the sides of the drawer band which enables the wearer to adjust the waist easily after putting on the garment.

HOSIERY

The present situation in the hosiery end is one that is considered better than was anticipated a month ago. Spring lines have all been opened and very satisfactory results thus far obtained. Buyers generally have placed orders freely at advance prices and several mills are already sold up for the year.

Children's low and medium priced lines have been exceptionally active and one manufacturer who advanced his price from 62 1/2 to 67 1/2 cents took orders enough in two days to run his mill for fourteen months, and another sold up a nine months' production in twenty-four hours at a similar advance.

Ladies' goods at from 60 cents to $1.00 have been advanced from 2 1/2 to 5 cents per dozen, but lines that have been priced at $1.00 and upward, are generally quoted at last year's prices. It is said that the manufacturers of the better grades made sufficient profit the past season, so they can maintain about the same prices and still have margin left for the present year, but that those makers who made the low priced goods did not show a profit in their mill and must of necessity get an advance to offset the increased material costs, as well as the additional price of labor.

Fall lines of hosiery are in a well sold up condition. So far there has been no attempt to place duplicate orders for fall weights, but there is such a small margin of production yet to be taken care of, that very little activity would create a scarcity.

The first mention of worsted in English official records, is found in the eighth year of Edward 2nd (1315), stating that a complaint had been made to Parliament against Norwich clothiers who were making worsted pieces twenty-five yards long and selling them as thirty, the regulation length.

It is believed that the first fulling mill in the American colonies was installed in the village of Rowley, Mass., in 1643. Other mills were erected at Watertown in 1662; at Andover in 1673; at Ipswich and Salem in 1675; and at Barnstable and Byfield in 1687.

STRIPED SEAMLESS HOSIERY

A method of knitting striped seamless hosiery has recently been patented and is described by the inventor as follows: The entire tubular portion of the stocking is knit by a continuous rotary motion, with insertion of heel and toe pockets by reciprocatory

FIG 2

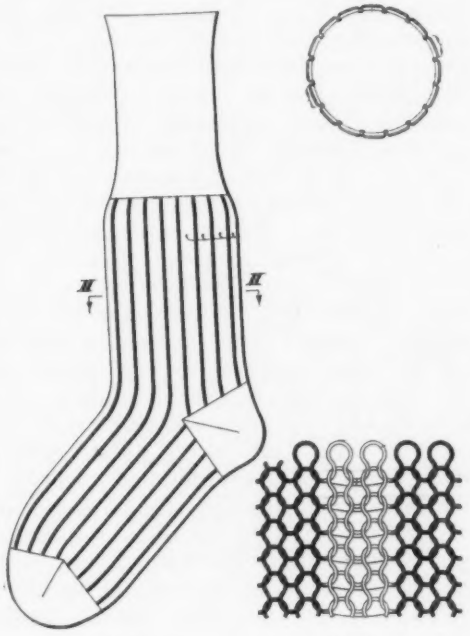

FIG. 1

FIG 3

knitting, the stocking being without any sewed seam except the looping required to close the toe pocket. The production of vertically striped fabric under the limitations of these machines involves problems quite different from those which have heretofore been solved in the production of striped knit fabric upon flat machines. The resulting product is structurally different and is commercially a different article from striped seamed hosiery.

In striping seamless hosiery recourse has been had to the rapid alternation of two threads coincidently course after course in such a way as to produce continuous vertical stripes knit with one thread while the other thread is floated across the back of the fabric during this interval. The objection to hosiery thus produced is that the interior of the stocking is filled with a mass of floating threads, which are objectionable in appearance, troublesome when the stocking is being put on, and even if cut off by a special operation after the stocking is knit, present on the inside of the stocking loose ends which are untidy in appearance. If these floats are not cut, the stocking is useless because of lack of elasticity.

In order to avoid these floats vertical stripes are produced in seamless hosiery by a plating operation. Two threads are fed to the needles simultaneously, but in such relation to each other that one constantly passes

FIG 5

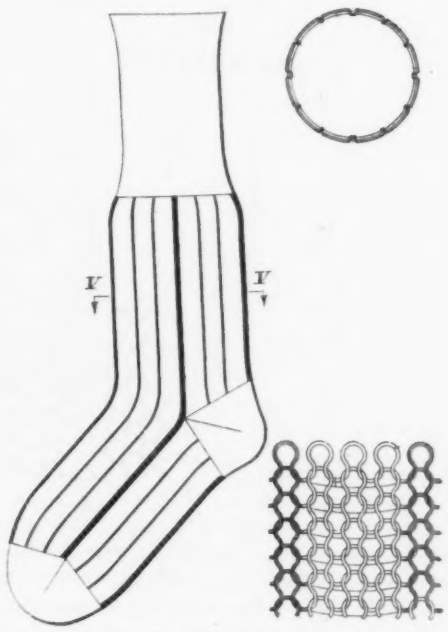

FIG 4

FIG 6

to the face, while the other passes to the back of the fabric. The thread which lies upon the face is called the plating yarn, and the other the body yarn. The best method would be to form the stripes by the regular coincident inversion of the plating yarn and body yarn course after course at intervals corresponding to the width of the stripes to be produced. Practical difficulties involved in the production of such a striped stocking have not yet been solved. This substitute

consists in making striped seamless hosiery in which alternate stripes consist of plated work, while narrow intermediate stripes are formed by knitting with the body thread only, forming wales of plain knitting, where the plating thread is floated on the back of the fabric. Striped hosiery of this type with broad stripes, constituting a ground-work fabric formed by plating, alternating with narrow stripes in which the body thread is

FIG. 8

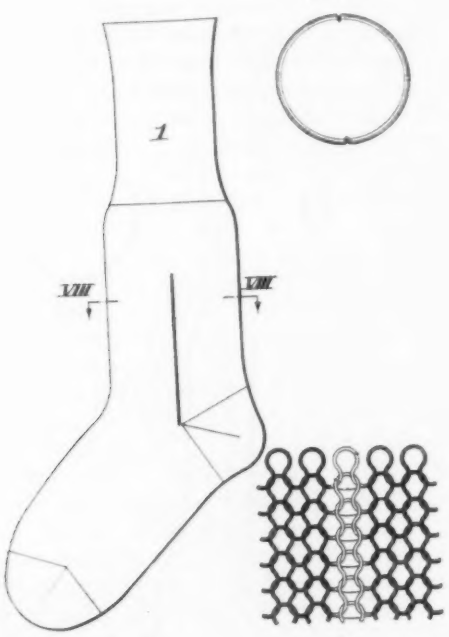

FIG. 7 FIG. 9

knit alone while the plating thread is floated. A float thread of two or three wales interval on the inside of the stocking is insignificant in appearance, occasions no trouble in putting on the stocking, does not materially interfere with the lateral elasticity of the fabric and is unobjectionable.

The underlying plan involved in the production of this kind of hosiery is based upon the fact that in any one course the aggregate width of the wales of plated knitting must be so great in proportion to the aggregate width of the wales of plain knitting across which the plating thread is floated, as to maintain without substantial impairment the lateral elasticity of the stocking, and that within the limitations of this plan a large variety of striping can be produced.

Fig. 1 shows a seamless stocking in which the narrow two wale stripes are formed at equal distances. Fig. 2 is a section along the line, 2—2, Fig. 1. Fig. 3 shows the formation of the stripes in Fig. 1. Fig. 4 is a seamless half hose in which certain of the stripes are 3 wale and others 1 wale. Fig. 5 is a section along the line, 5—5, Fig. 4. Fig. 6 shows the formation of the stripe. Fig. 7 shows a seamless stocking in which two narrow stripes are on either side of the leg. Fig. 8 is a section along the line, 8—8, Fig. 2. Fig. 9 shows the construction of the stripe. Fig. 10 shows the position of the needles and thread during the knitting of the striped hosiery. Fig. 11 is a plan view of the circle of needles showing how they are manipulated to produce the short floats. Figs. 12 and 13 are enlarged views of the needles. Certain of the needles corresponding in position to the narrow stripes are withheld from the temporary advance which is given to all the other needles prior to their stitch-forming depression. The plating thread is fed to the needles in advance of the point where the body thread is fed and at a flatter angle. As a result the threads and needles occupy the positions in relation to each other during the knitting operation indicated in Fig. 10. The ordinary needles, 20, at the left of the drawing have advanced to the thread receiving level. They are depressed by the stitch cams along the lines, 22 and 23, to form the stitch. They are again advanced to the normal level along the line, 24. On the other hand, the special needles, 25, by which the narrow stripes are to be formed, to not receive the preliminary advance, but enter the knitting operation at a level represented by the dotted line, 26, which reaches a point where all of the needles act in unison in the middle of the stitch-forming descent of the other needles.

The plating yarn, 30, is fed at the point, 31, passing under the hooks of the needles and ultimately entering the knit web at the point, 32. At the point where this thread is fed to the needle the special needles, 25, are depressed below it and consequently they do not receive the plating yarn under their

hooks. Furthermore, this point, 31, for the feeding of the plating yarn is far enough in advance of the knitting to allow the plating yarn to be wrapped tightly against the upright inner edge of the hook of each of the ordinary needles before they are brought in line with the special needles. When the plating yarn reaches the gap or space corresponding to the two special needles which have not been advanced, it is drawn tightly across between them so as to form a chord of an arc. At this point two special needles fill the gap, but at a level below the thread. As the other needles descend they carry the plating yarn down with them and owing to the angle at which this yarn passes from its

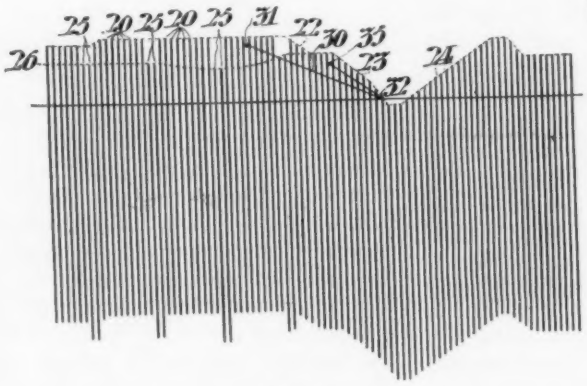

FIG. 10

guide and into the knitting it rests against the upright edge of the hook at its thinest point when the special needles come in contact with it, in consequence of which the curved tops of the hooks of these special needles come into contact with it at a point behind their summit, so that it passes, not in front of, but behind the special needles, and the plating yarn does not enter the hooks of the special needles. The body yarn is fed from the point, 35, nearer the knitting than the other thread, and enters the knitting in the usual way, being received by both sets of needles.

The precious purple of the old Greeks and Romans was made from the juice of the purple snail.

MILL EXPERIENCES

Under this head we will publish from time to time stories from practical mill men, telling of vexatious and unusual difficulties which have occurred in different branches of mill work, and how they have overcome them. We invite mill men to send us an account of such experiences. We pay, of course, for all that we use. Facts told just as you would tell the story to a friend are what we want, not fancy writing.

KNITTING MEMOIRS

BY TRENTON

One day I was sitting in a knitting frame builder's office in Philadelphia when a letter was received which stated that a superintendent was wanted in a Southern mill. I had never had charge of a mill as superintendent,

FIG. 11

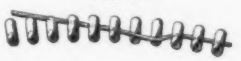

FIG. 12

FIG. 13

but as it was between Christmas and New Year's with a lot of cold weather ahead, I decided to try the place. I arrived in the Southern town after dark and went to the home of one of the owners of the mill, where I lived during my stay in town. The mill was leased by a company of three and had not been run for years. None of them knew a knitting frame from a napper. We went out to the mill next morning to look things over. The frames in the knitting room were old timers, but were old friends, as I had run them before. There was a good knitter there, a man from the North, but he was young and lacked experience. The balance of the help was almost impossible. I started in to get the knitting room going. The first frame I took down was a 12-inch machine, 8

needles to the inch, running on shaped goods. It was in bad shape all the way through. The spindle was too small for the dial and wobbled around like a drunken sailor. The slots of both dial and cylinder had been filed away so much that two needles would almost go in one slot. The bed plate had worn uneven and on one side would ride the gear, making a noise like stage thunder. All the cams were in bad shape, most of them being home made and very soft and uneven.

After taking the frame apart, I sat down and looked it over. The guides had almost cut through, the take-up springs were of no use, and as far as I could see the legs were about the only thing that could be used again. It was a tough job, but I started in on the cylinder, filling the slots with babbit, filing them out, and doing the same with the dial. I had a man file them while I looked over the cams. I put these cams in my pocket, got on a train, took them to a blacksmith's shop and hardened them as best I knew how. I then put them back in the frame and took the dial to town for a new spindle. I got a piece of shaft of the right size and the machinist cut the threads for me. By this time the cylinder was ready and looked very good.

I put the frame together, putting the cylinder needle in and let it run without the dial for an hour. It ran so unevenly that I took off the cam ring and bored and tapped holes for 1/4 inch screws that went up through the bed plate from underneath. I regulated the cam ring this way and it ran quite true. The spindle I had made fitted well so I put in all the needles and put the cloth on for a trial, robbing other frames for screws and springs to get started. I started the frame and it ran well outside of a few smashes caused by poor yarn and no waste finger on the stop motion.

This was about the worst job I ever tackled, as the machines in the finishing room were no good and the help incompetent. I had been four days on one frame and was disgusted for I knew the mill would not pay. I also knew that no knitter would stay on the job. If we filled all the frames with babbit like the first one, by the time we got around to the last one, we would have to start all over again and continue the performance. I could get no work through the mill. I had ordered a new button hole and button sewer and a few parts for the knitting frames, but I was not there when they arrived. I got so tired of trying to figure out when we could ship a few dozen garments that I went to the firm and told them just where they stood. There was nothing I could do for the machines had been through fire and water twice that I knew of. I had enough of it, so quit on the spot after seven or eight days of it. I did not care about going North just then, so a few days later I was in southern Georgia and running a set of frames.

OIL STREAKS IN KNIT GOODS

BY TRENTON

Oil streaks, caused by oiling the needles of circular knitting machines, are a constant source of much worry to all boss knitters. In former times, during the brass dial and cylinder period, there was not much of this trouble. But as some mill owners complain about a cylinder not lasting forever, the builders have made a wrought iron or steel cylinder, that gives the needle all the wearing surface possible. I had a lot of this trouble at one time. A few drops of oil in a perfectly clean cylinder would ruin half a roll of cloth. As I was using silk and worsted this was a serious matter. I had tried vaseline around the bottom of the cylinders, but when it got warm it worked to the top and showed in black streaks. I heard several complaints of black streaks going through a roll from end to end. This roll was from a 17-inch machine. I placed myself in front of that frame with the determination of solving the difficulty. This frame was made for a deep welt, and had a higher cylinder than usual. It also had a longer needle with a short butt. I could see the dirty oil in the needle slots as it pumped up and down. I tried to wash it clean by throwing oil around the cylinder. As this ran over a roll and was expensive I stopped

it. I sat in front of that frame two days before I happened to remember about the old brass cylinders, how they were cut out behind the needles about half an inch. I had this cylinder cut out in a local machine shop, standing there while it was being done to see that it was done right.

After going through all the slots with a needle and brush to get all the chips and grit out, I put it back on the frame and got it going. The oil showed a little the first few yards, and when clear I gave the cylinder another bath. The result was not satisfactory as the oil showed up for at least ten yards. I had only half an inch cut out of cylinder. There being plenty of room to cut out a full inch, I took it back to the machine shop and had a full inch cut out, 1/16 inch deep. After starting there were no oil spots after about a foot or so was knit. Again, I threw oil all around while running and waited. When I saw that the spots did not appear I decided to wait a week and give it another trial. After a week or so I gave the frame another bath and the cloth came down black and full of oil, but it soon ran out.

I next tried a regular 12-inch cylinder. I had this cut out below the sinkers and above the slot wall. This was not quite an inch, but it answered the purpose. After having it cut out I started it running and gave it a good bath. There was a wonderful improvement, for the dirty oil did not show for more than a yard. After a few weeks' trial I had all the cylinders cut and the trouble with oil spots stopped. This space behind the needles soon gets full of waste and makes the cloth look bad when oiled. When the cloth runs off the needles it is a good time to clean this waste out, or if packed hard have it picked out before oiling.

The wear on the cylinder will not begin to pay for the cloth wasted.

AN IMPROVED WELT

A method of joining the welt to the stocking leg so as to prevent raveling has recently been patented in this country and is described by the inventor as follows: When garters are applied to the ordinary stocking, owing to undue strain upon the fabric, they have been found to ravel, which not only affected the welt but also injured the leg of the stocking. The principal object of the improved construction is to avoid this objectionable feature in hosiery, and to provide a stocking in which raveling will be confined to the welt of the stocking alone.

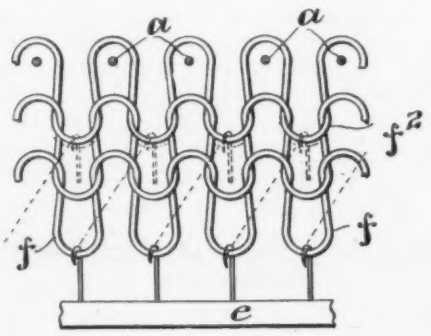

FIG. 1

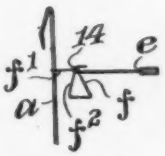

FIG. 2

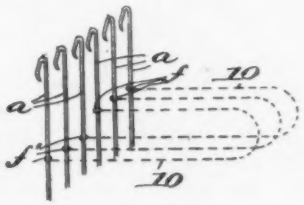

FIG. 3

Fig. 1 is a plan view of sinker formed loops interlaced with needle formed loops and a hook-frame to hold the first course of sinker loops away from the needles during the knitting of the welt. Fig. 2 is a side view, in detail of the sinker formed loops of Fig. 1, held together out of action of the needles on the hook-frame and also showing a needle formed loop held on the needle-shank. Fig. 3 shows a series of bearded needles with loops on the needle-shanks out of range of the beards of the needles and also the loops formed on the same needles, but transferred to other needles of the series

of the bed by means of yarn or by action of needles alone, to provide a certain interlacing where the welt joins the leg of the stocking. Fig. 4 shows parts of a flat bar knitting machine employed to produce the effect shown at Figs. 5 and 6, one of the bearded needles with yarn being shown, and also loops held on the shank of the needle so that when two sinker loops are caught under the beard of the needle with a new yarn the loop on the needle-shank will be cast over the three loops to become interlaced. Fig. 5 shows the complete loop. Fig. 6 is an enlarged view of three sinker loops interlaced with yarn by needles according to the method shown at Fig. 4.

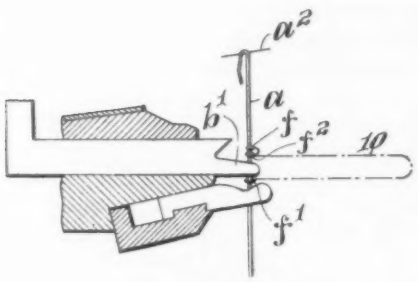

FIG. 4

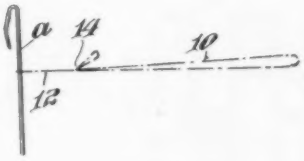

FIG. 5

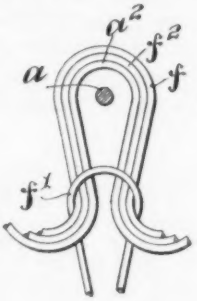

FIG 6

A knocking off bit is arranged below the presser-bar and is acted upon to hold a loop formed by a sinker on the needle-bar away from a loop formed by a needle on the needle-bar, either above or below the nose of a sinker.

Fig. 3 shows a method of transferring sinker loops, f, onto needles located two or more spaces away from the needles between which these loops were formed, the purpose of which is to enable a staggered interlocking of the yarn and loops where the welt forms the leg of the stocking, preventing raveling of the welt from extending into the leg.

Figs. 1, 2, 4, 5 and 6 illustrate a method of providing an additional interlacing of loops by drawing off the first course of sinker-loops, f, onto a hook-frame, e. When the third course of sinker loops are formed, they are placed over the first course of loops, f, of the hook-frame, e. Plain knitting is continued until the welt is completed. The two sinker formed loops, f and f^2, held by the hook-frame, e, are then placed over the bearded needles, a, and loops, f and f^2, of the yarn, a^2, are caught under the beards of the needles, a, and passed through the needle loops, f^1, and then cast off to complete the interlaced looping as illustrated in Fig. 5, where the completed welt, 10, joins the leg of the stocking, 12. The character of interlacing of the loops at such point is clearly shown at 14, in Figs. 2 and 5.

BLEACHING LADIES' AND CHILDREN'S UNDERWEAR

BY HECTOR

Some years ago I was working in a lace mill as bleacher and finisher when a manufacturer of knit goods came along and asked me for some information regarding bleaching underwear, as he intended to install a bleaching plant in connection with his mill. I told him all I could, gave him the information, and in about six months' time I was taken into their employ. They were then having a number of complaints about yellow places in the goods and the difficulty was so serious that they discharged their dyer. They had a bleachery large enough to take care of two mills. There were six tanks in a line, each 6 feet by 4 feet by 4 feet; two large iron tanks for mixing chloride of lime; a large laundry washing machine and a hydro-extractor. When I looked into the first tank I found that the former dyer had been using it for a boiling kier. He had the steam pipe below the false bottom. I found a piece of cast iron pipe to use as a vomit

pipe. I did not like the idea of boiling from the bottom. While the vomit pipe was being fixed I looked over the other tanks and found that No. 2 tank had been used for washing off; No. 3, as a bleaching tank; No. 4, for washing off; No. 5, for souring, and No. 6, for washing off. I saw right away that the goods need not be handled all the way down the line of tanks, so I got No. 1 tank ready and the dyer threw the rolls in one on top of another. It seems that this was the way the work had been done previously, and I began to see right away what had caused the yellow marks. I put a piece of pipe through the center of the roll and hung the pipe up by its two ends. I then took the end of the goods and walked out with it about 12 yards, laid the goods back and forth and fastened them up with rags one yard apart. When the goods were all tied up I weighed them. To 100 lbs. of goods I used 1 lb. caustic soda and 1/2 lb. soda ash. I boiled the goods four hours, run them off, then put on water and steam together and brought them to a boil; run off and this time made them cool enough to handle. Then I put the goods into No. 2 tank, which I had filled with a chloride of lime solution at 2° Tw. I let them stay in this solution about 45 minutes, when I put some planking over one-half the tank and lifted the goods on it to drain the chloride of lime liquor back into the tank. The goods were next washed in cold water, and soured in the washer by running for 15 minutes in a solution of sulphuric acid at 1/2° Tw., and rinsing. Next came a run in a light suds of olive oil soap and bluing. Run off and put in an extractor. While one batch was running in the washer another batch was being boiled. The first batch was hung up to dry and the next morning the goods were a good color and soft to the feel. When the goods were taken from No. 3 tank the next morning the manager wanted to know where the other three tanks came in. I told him we had no use for them. He told me it had cost him thousands of dollars for bad work and extra machines.

Notwithstanding the fact that we were turning out good work the firm thought they were paying me too much. As I made the job look easy they thought they could get a cheaper man. I found out they were paying me $5 a week less than the man that had left. However, I kept on working and one day the manager came along with some union suits he wanted scoured. They were a mixture of wool and cotton. I found out what length he wanted when finished and put them in the washing machine, wet them out and then put in some good soap. I run them in this solution ten minutes and then stopped and measured a few of them. When the right length was right I took a note of the time required and it was an easy matter to finish up the rest.

In about a year's time I found another place. There was nothing wrong, but I knew they were not satisfied, thinking they could get the work done for less money. In about a year I went back again and there was a young man doing the bleaching. He told me that every once in a while the goods were off color, but he thought it was due to the cotton. A great many mill men make the mistake of having a cheap man who will spoil a few hundred dollars' worth of goods once in a while.

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SIZES OF KNIT GLOVES

Editor Textile World Record:

Can you give us the standard sizes for knit gloves? Century (2211).

This question has been referred to an experienced buyer of gloves, who replies as follows:

I have never seen any standard scale of sizes for knit gloves. There is a variation in the sizes of these goods as made by different manufacturers. The fingers of some lines are a trifle longer than others. For this reason it is advisable to carry the lines made by two or three different manufacturers in order to fit different hands. The kid glove manufacturers have a regular standard of sizes, but the knit glove manufacturers make three or four different sizes which they stamp to suit their fancy. One knit goods manufacturer may call their three sizes, 7, 8 and 9, while another manufacturer may call the same sizes 6, 7 and 8. Fillmore.

Dyeing, Bleaching, Finishing, Etc.

ESTIMATION OF THE STABLE HYDROSULPHITES

By Morris M. Revelis, winner of the Textile World Record Gold Medal at the Philadelphia Textile School.

Under the general name of stable hydrosulphites there are a number of patented chemical compounds on the market, which find their chief use in the textile industry. These compounds come in trade under different commercial names, and according to

MORRIS M. REVELIS

their technical uses in the textile industry, they may be divided into three classes:

1. Dyeing Class, including the hydrosulphites used in the dyeing of indigo and other "vat" colors.

2. Stripping Class, including the hydrosulphites used for stripping or removing colors from dyed materials.

3. Discharge Class, including the hydrosulphites used for discharging colors from dyed materials for the production of white and colored effects employed in calico printing.

The latter may further be divided into two subdivisions:

(a) Azo color discharges.
(b) Indigo discharges.

The members of each class are well defined in their chemical composition and also in their physical and chemical properties, therefore a member of one class cannot, with advantage, be substituted for a member of another class, thus:

The hydrosulphites of the dyeing class are the sodium hydrosulphites, having the chemical formulae $Na_2S_2O_4$. They are soluble in water, acids and alkalies, and retain their reducing properties in alkaline solutions, which distinguishes them from the members of the other two classes.

The hydrosulphites of the stripping class are the zinc-formaldehyde sulphoxylates, of which there are two compunds on the market, 1, The mono-zinc-formaldehyde sulphoxylate having the formula $Zu(HSO_2CH_2O)_2$ and 2, The di-zinc-formaldehyde sulphoxylate having the formula $ZuSO_2CH_2O$. The former is soluble in water, the latter is insoluble in water, but they are both insoluble in alkalies, which makes them distinctive from the dyeing and discharge classes.

The hydrosulphites of the discharge class, Division A, are the sodium-formaldehyde-sulphoxylates, having the chemical formula $NaSO_2CH_2 + 2H_2O$. They are soluble in water, acids and alkalies, but do not retain their reducing properties in alkaline solutions, which makes them distinctive from the dyeing class.

The hydrosulphites of the discharge class, division B, are the same as for division A, but in combination with a compound consisting of a tertiary base of the ammonia type with benzyl chloride, or possibly compounds of similar composition. The value of this

compound is its property of forming a soluble compound with indigo-white, which is not oxidized by atmospheric oxygen to indigo-blue.

From the above it can be seen that although the members of the above classes possess distinctly different properties, and a member of one class cannot be with advantage substituted by a member of another class, yet their most valuable constituent, i. e., their active reducing principle is the same in all these compounds, as they are all derivatives of hydrosulphurous acid, hence they afford a possibility for a general method for their estimation.

ANALYSIS OF THE HYDROSULPHITES

The analysis of the hydrosulphites must consist in the determination of the class to which they belong and in the estimation of their total reducing power.

DETERMINATION OF THE CLASS THE HYDROSULPHITE BELONGS

1. Test the hydrosulphite under examination for its solubility in water, in acids, and in alkalies. If insoluble in water or alkalies, but soluble in acids, it belongs to the stripping class. Care must be exercised in distinguishing between the insolubility of the hydrosulphite and the presence of an insoluble residue, as some of the hydrosulphites of the discharge class contain zinc oxide or lithopore, which act as a white pigment for white discharges. For this reason the insoluble residue must be filtered out, washed with water, dissolved in acid, and the solution thus obtained must be tested for reducing properties with $K_2Mu_2O_8$. If it does not reduce $K_2Mu_2O_8$ it must be considered as a pigment.

1. If the hydrosulphite is soluble both in water and alkalies, then take about one gram of powdered indigo, grind it up with about 50 cc. of a 5 per cent. NaOH solution. Pour a portion of this into a test tube and add to this a small portion of the hydrosulphite under examination. Shake it up and place the test tube in a bath of hot water for 10 minutes. If the solution acquires a deep yellow color due to the reduction of the indigo to indigo-white, the hydrosulphite belongs to the dyeing class.

3. (a) If the hydrosulphite is soluble both in water and alkalies, but does not reduce indigo to indigo-white, it belongs to the discharge class, division A.

(b) The hydrosulphites of the discharge class, division B, can be distinguished from the other hydrosulphites by their color, as the "indigo discharges" are all of a light brown color, while the other hydrosulphites are either white or light gray color. A better method is to reduce some indigo to indigo white (by the use of a hydrosulphite of the "dyeing class") and to this is added an excess of the hydrosulphite under examination. Shake it up, place the mixture in a bath of hot water for 10 minutes. Filter. If the filtrate will be of a yellow color, due to the formation of the "indigo-white compound," which is stable to atmospheric oxidation, it belongs to the discharge class, division B. A still better method is to make up a paste by boiling together one part of dextrin and two parts of water. When cold one part of the hydrosulphite under examination is added, and the mixture stirred well. A piece of indigo dyed cloth is then taken and a design is painted on with the above paste by means of a small brush. The cloth is allowed to dry, and is then covered with a moist piece of white cloth and pressed with a hot iron. The cloth is then washed in hot water and then in an alkaline solution, and again in water. If the white discharge developed is stable, not turning blue again by atmospheric oxidation, it belongs to the discharge class, division B.

ESTIMATION OF THE TOTAL REDUCING VALUE OF THE HYDROSULPHITES

The writer was trying to devise a method for the estimation of the reducing value by means of the azo dyes, thus finding directly the reducing power of the hydrosulphites on the dyestuffs, but the instability of the hydrosulphites in acques solutions toward atmospheric oxidation requires the conduction of the analysis in an atmosphere free from oxigen, which would make the method too complicated for ordinary technical analysis.

There was also a possibility of adding the dry hydrosulphite to an excess of the dye solution, in which case all the reducing power of the hydrosulphite would be used up, but the absence of a stable reducing agent for the each titration of the excess of the dyestuff, which should work quantitatively, compelled the writer to look for a more suitable method.

From further experimental work the writer came to the conclusion that iodine is about the best reagent available for this purpose, the analysis being conducted as follows:

50 cc of a w/5 iodine solution are placed in a beaker, or still better, in a wide necked flask (wide enough to permit the introduction of a weighing bottle). The solution is diluted to about 200 cc, and 5 cc of a 10 per cent. solution of H_2SO_2 is added. (The H_2SO_2 acts as a precautionary means against any free alkali present in the hydrosulphite, which if not neutralized would vitiate the results of the analysis.) About 0.2 to 0.3 gm. of the hydrosulphite under examination is weighed out in a sealed weighing bottle, and after removing the stopper, the weighing bottle and stopper are both immersed in the iodine solution.

The solution is then stirred, and the beaker or flask covered with a watch glass and allowed to stand in a dark place for 10 minutes. The solution is again stirred, and if all the hydrosulphite has been dissolved, the excess of the iodine is titrated back with a w/5 sodium thiosulphate solution, using starch as the indicator. The number of cc of iodine solution required by the hydrosulphite is noted.

From the amount of iodine consumed the reducing value of the hydrosulphite can be expressed either in terms of hydrogen, or still better in terms of a standard dyestuff, thus giving closely the reducing power of the hydrosulphites on the dyestuffs. For this purpose the writer suggests indigo as the standard, and that the reducing value of the hydrosulphites be expressed as the "indigo value," representing the percentage of indigo which can be reduced by the hydrosulphite.

One molecule of indigo requires two atoms of hydrogen. Hence 1 cc w/5 iodine solution will correspond to .0262 gms. of indigo. The number of cc of w/5 iodine solution consumed by the hydrosulphite when multiplied by the coefficient .0262 gives the number of grams of indigo, which can be reduced by the weight of the hydrosulphite taken. Now, by multiplying the number of grams of indigo reduced by 100, and dividing by the weight of the hydrosulphite taken for analysis the "indigo value" of the hydrosulphite is obtained.

The following example, which is taken from analysis of a sample of hydrosulphite will illustrate the above:

0.2 gm. of hydrosulphite was taken. After each titration of the excess of iodine solution it was found that the hydrosulphite had consumed 27.1 cc of w/5 iodine solution.

$27.1 \times .0262 = .71002$ gms. of indigo.
$(.71002 \times 100) \div .2 = 355\%$ of indigo.
Hence the indigo value is 355%.

These calculations may also be utilized for practical purposes, such as for calculating the necessary amount of a certain hydrosulphite to reduce a definite quantity of indigo. For other vat colors the only thing necessary will be to change the coefficient, according to their chemical formulae. Also the amount of hydrosulphite necessary to strip a certain quantity of dyed material can be calculated, by knowing the depth of shade and the chemical formulae of the dyestuff, which however is only possible if the material was dyed at the same dyehouse.

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About the year 1819 the spinning-jenny was introduced at Peace Dale. A thirty-mule jack purchased about that time was successfully operated by water power.

The common prices over a century ago charged for carding white wool were seven to nine cents per pound for common wool, with three cents a pound additional where the oil was found by the carder, twelve and one-half cents per pound for half-blood merino, and twenty-five cents for full-blooded merino, the charge for oil being the same in all cases.

PRACTICAL HINTS ON ECONOMIES IN MERCERIZING

BY RAFFAELE SANSONE

From the Dyer and Calico Printer

In the early days of mercerization it was conducted under very expensive conditions, and could only be used for the production of the finest articles, which were sold at prices that fully compensated the expenses of manufacture The goods were treated in a strong caustic soda lye from 52° to 64° Tw., prepared by dissolving solid caustic in hot water; and the solution of this substance was the most dangerous and troublesome step in the process, requiring workmen of intelligence and ability. The cylindrical iron drums, containing the caustic soda, were first beaten with a sledge-hammer in order to break the solid mass into pieces of convenient size. A workman then cuts off the sides of the drum by means of a long chisel and hammer, and, with a few cleverly-driven blows, splits open its middle joints. After this had been accomplished the weight of the broken caustic was sufficient to open out completely the remaining portion of the drum, and the pieces being spread over the ground could be charged into the boiler for solution.

There were difficulties also in the charging, as the large, heavy pieces of caustic had to be lifted by hand and thrown into the boiler or tank, using a piece of sackcloth in order to avoid any contact of the alkali with the skin of the workmen. Clumsy hammering or handling, on the part of inexperienced workmen, led to serious results, as any bits of the concentrated substance that found their way on the skin not only burnt badly, but, if left for some time, gradually absorbed moisture from the air and burnt a small hole. The writer can remember a case in which a workman had a similar hole burnt on one of his eyelids; by an immediate treatment with weak acid the lye was neutralized before it reached the eye. Fortunately, however, all wounds or holes made by caustic soda heal very rapidly, as the strong cleansing and disinfecting properties of the drug act very favorably.

When the caustic soda had been dissolved, it was cooled down by means of a stream of cold water running all round the tank in which it was contained. In some works, by additions of ice, this temperature was carried as low as the freezing point of water. It was believed that the cold liquor avoided any border breakages during the stretching. This necessitated the constant employment of ice, and special refrigerating plants had to be provided, which added considerably to the cost of the process of mercerization. The goods were treated on an ordinary padding machine, where they were saturated with the liquor in two or three passages, according to the thickness of the cloth mercerized. The padding was generally done at some distance from the mercerizing range, or stenter, so that the batches of impregnated material had to be transported by two workmen, and the end of the cloth sewn to that of the last piece stretched. As the clips in those days had not arrived at their present perfection, two workmen, one on each side of the entering goods, had to guide the cloth. All these operations were very trying for the workmen, who in many cases suffered considerably through the corrosive effects of the strong alkali.

Before and after the stretching, the goods were not squeezed in any way to expel the excess of strong liquor; and as the brightest and finest effects were produced by such a treatment, all following operations were only intended for expelling the alkali from the cloth. For this purpose several wooden wash boxes were placed after the stenter, and as the goods came from the latter they were submitted in the first boxes to a very energetic washing with running water. As this was never sufficient to expel the last traces of caustic soda, which generally clings very fiercely to the fabric, the cloth was then soured; and for this purpose a fairly strong acid solution was used, that had to be washed out completely in the next boxes.

In this way any strong liquor remaining in the cloth after padding and stretching was completely wasted. As the quantity of caustic soda contained in the lye, which ranges from 18 to 23 per cent., is very considerable, it can well be imagined what amount was lost

in each treatment. In some works an attempt was made to utilize a small portion of the alkaline washings obtained in the first washing boxes for boiling-out purposes; but even in this case the quantity saved was so small as scarcely to be compared with the enormous quantities of liquor which had to be evacuated through the mains, and the goods treated were tendered to a certain extent by the high temperature of the kiers. The corrosive qualities of the alkaline waters sent out of the works caused no end of damage, especially when they found their way into rivers or lakes, where the fishes were killed for miles.

These conditions, owing to the high prices obtained for mercerized goods, were not felt at the time; but when these goods began gradually to gain favor everywhere, principally as substitutes for silk, the position changed. Nearly every dyeworks of importance took up the practice of mercerization, and soon the market was flooded with mercerized goods, with the result that the selling price was considerably lowered. Small concerns that till then had sold their goods successfully were the first to feel this competition, and many had to give up mercerization altogether.

This led to the necessity of constantly increasing the production and reducing the price of manufacture. In larger works a closer study was given to the machinery employed, and many important changes were soon introduced which quickened the process of treatment, rendering much easier the production of the finest effects. These improvements were, however, not sufficient for the times; for the majority of the changes introduced in many localities, although very jealously concealed, were soon known and imitated everywhere, and a further reduction in the price of manufacture was necessary. The result, as was to be expected, acted very unfavorably on the quality of the mercerized goods, and many articles of inferior quality were soon launched on the market. The brown Egyptian and sea island cottons, which represented at a time the only sorts of cotton that could be used for the finest effects, were soon mixed or substituted with inferior grades of cotton, and the luster that mercerization could not give in such material was obtained, to a certain extent, by mechanical means.

In this way the splendid goods, that equaled in many cases the brightest silk goods in luster, became duller and duller, and in some works a sort of artificial polish was applied by means of silk finish calenders at a high temperature, which covered so effectually the poorly mercerized goods as to produce special classes of cloth that satisfied many clients. This reduction in the price of mercerized goods was, however, continued in a constantly increasing ratio when both chemical and mechanical changes in the process made mercerized goods among the cheapest articles on the market. These changes include the process of caustic soda recovery, which permits the utilization of all waste liquors produced during the process of mercerization.

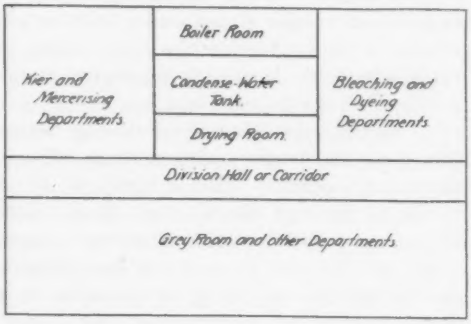
In order better to understand the real value of the process of caustic soda recovery, it is necessary to consider the chemical reaction that takes place during the treatment of the goods. Mercerization is considered by many scientists as a process of hydrolysis in which the cellulose of the cotton is transformed into hydrocellulose. During this reaction the caustic soda, although playing a very active part, undergoes practically very little change; and if it were not for the gradual accumulation of impurities from the goods treated, and for the formation of sodium carbonate, owing to the contact of the lye with the carbonic acid of the air, after each treatment the caustic soda could be simply concentrated and used over and over again. In the older processes of mercerization this was not the case, for the cloth had to be treated with fresh caustic soda each time, as after the passage of each batch of goods a certain quantity of the lye was used up completely, and the trough of the padding machine had to be replenished continually with new liquor.

In the caustic soda recovery process all this is avoided, for not only is all the caustic soda left in the pieces extracted and utilized,

but it is obtained in a liquid form, which can be used straightaway for mercerizing, or has simply to be diluted to the required strength. Like every innovation that brings with it a fresh set of difficulties, the recovery of caustic soda from the cloth and washings encountered at first a great deal of antagonism on the part of mercerizers, who in many cases did not understand how the alkali could remain unaltered during the mercerizing process, and considered that recovery was a useless complication of the methods to which they were accustomed. This antagonism went on so far in some centers that many foremen actually refused to make use of the plants constructed for the purpose, or if they condescended to use them, took no trouble to work them properly. This naturally militated against the success of the new recovery process, the value of which was not appreciated for a very long time. When, however, the great economy realized by it became generally known, despite prejudice caused by imperfect working, the process began to be practiced everywhere.

Today, the advantages of caustic soda recovery are no longer doubted, and the process has become so essential a step in mercerizing that nearly every mercerizing establishment has a recovery plant. This does not mean, however, that the mercerizing process cannot be subjected to a further reduction when all possible factors of economy are taken into account, and in the following lines we shall endeavor to describe a mercerizing and caustic soda recovery plant of the future, in which everything is so disposed as to embody to the utmost advantage all those economical applications that can reduce the price of the manufactured goods.

The making up of a modern mercerizing plant, furnished with all necessary machinery for a systematic caustic soda recovery, is no easy matter, and requires a great deal of study. With the rapid transformations recently introduced in the process of mercerization, and the constant rise in the price of coal, on which the recovery is greatly dependent, it is not sufficient to secure the best and most efficient machinery, but a matter of first importance to take advantage of all modern arrangements that can assist the process, placing it under the very best working conditions. The mercerizing of cotton cloth is seldom undertaken by itself as a much wider field is offered when it is carried out together with bleaching and dyeing. In the majority of cases it is conducted in a special department, which is generally not



far from the bleach works or dye house. This places the process under very favorable conditions as the same boilers, generating the steam in either or both of the two last named departments, can be used for the mercerizing and recovery plant, and if some means is adopted for collecting the escape steam and condense coming from every part of the works, the soft water can be utilized for many purposes. This reduces considerably the quantity of steam used, and avoids, in working the boilers, the necessity of constantly raising the pressure. This in many works often sinks too low, and requires much charging by the workmen.

A greater advantage can, however, be taken of the heating power of the coal if the boilers are so placed as to require a very small, or short, distribution of delivery tubing. In the accompanying sketch a plan of an ideal works is given, in which the boiler-room is placed in the center of the building, and the boilers are not only used for generating steam, but also as heating agents. The steam in this case is distributed in the two departments, on the right and left of the boiler room, by two short arms, from which the kiers, and other mercerizing, bleaching, and dyeing apparatus can be heated directly with superheated steam, as the length of the

tubing is not sufficient to permit the formation of much water of condensation. By covering the tubing with an efficient isolating agent, the amount of condense water can be further reduced and much less heat wasted than in those works where the steam is distributed over a very wide area. If care is now taken to fit each apparatus with closed serpentines or double bottoms, as the case may be, all escape steam and condense water can be made to flow into a large closed iron tank, where the former is separated from its water, and can be used again.

A suitable distribution of tubing between this tank, the boiler room, and the other departments permits the utilization of hot water all through the works. As this water keeps up a temperature running generally from 120° to 160° F., a great deal of heat is saved, and the warming of all baths or apparatus is done much sooner, thus saving considerably on the amount of time used for each treatment. Many inconveniences arising from the employment of natural waters are avoided completely, as the only impurity this water can contain is iron rust, which is formed through the rusting of the tubing. This can be avoided, however, completely if zinced iron is used all through the delivery tubing and storage tank, or the tubing and tank be kept constantly filled with water when the works are stopped for some time, which can be easily regulated by a certain number of regulating taps.

If the water tank is constructed of sufficient size, and surrounded by a stone wall of convenient thickness, one of its sides can be used as wall between the boiler and drying room. The heated surface thus exposed is, in this case, quite sufficient for the warming of the drying room.

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It has been proved that blue ribbons found on Egyptian mummies 5,000 years old had been dyed with indigo, such mummies now being preserved in several museums.

The year 1834 deserves special mention, a year in which stretching frames, scouring salts, and Perrot's machine (the perrotine), so excellent for reserve printing, were invented.

DIRTY GOODS IN THE FINISHING ROOM

By ELMO

The finisher often finds himself up against difficulties that are due to errors or mishaps in other departments of the mill and is sometimes blamed for trouble for which he is in no way responsible. The writer calls to mind a case of this kind that was due to imperfect work at a point as far as possible remote from the finishing department. I was called upon to correct a case of dirty goods. The very natural conclusion in such a case is that the finisher is not doing his duty, and if he fails to correct the fault, he will most likely lose his position, as the previous finisher had.

A peculiar feature of this case was that the mill was making two grades of goods and the kind that was composed of the dirtiest stock was coming along all right. They had been running on heavy cassimeres and overcoatings containing a liberal percentage of shoddy, and there had been no difficulty with the work until a part of the mill was put on a fine grade of all wool dress goods, which it seemed should be much easier to finish and get properly cleaned. I found that when the dress goods were being pressed there was a blue haze in the room, accompanied by a peculiar odor that suggested dirty goods, and yet it was not just such an odor as usually comes from goods in that condition. When the goods got cool the odor was scarcely noticeable, but after being packed in the cases for a time it developed to a most rancid smell, as I found in a case of pieces returned from the selling house.

What puzzled me was the fact that the heavy and low grade goods were coming as "sweet as a nut," while the goods that should be much easier to cleanse were far from right. This seemed to signify that there must be some difference in the treatment or condition of the two grades before they came to the finishing room, rather than any fault with the soap or scouring process. This seeming difference I felt I must ferret out, but in the mean time I made a special soap preparation for these goods and endeavored to have the work of fulling and

scouring properly and thoroughly done. But even this did not seem to give the desired results.

My first suspicions were that a different wool oil on the fine stock might account for all the trouble, but the superintendent assured me that the same kind of oil had been used on all the work, so that I was all at sea as to the cause, but this only strengthened my desire and determination to fathom the mystery if possible before my employers should conclude to try another man. They seemed to feel that my determination to find the cause and correct the trouble was worthy of their cooperation, and seemed ready to wait developments.

One day, while passing through the dye house, I noticed the dyer in the act of doing something that gave me a new clue, and I returned to my room to make an effort to follow it up, either to prove or disprove my suspicions. I noticed beneath the press, which was an old style machine with a single bed, an accumulation that had dropped from the edge of the bed, where it gathered until it was of sufficient quantity to drop to the floor. Upon examination I found it to consist of flocks or short fibers that were distinctly moist, and by working it in my fingers, I found it contained a greasy substance that gave forth an odor which strengthened my belief as to its origin. I noticed that the goods that seemed the worst contained a large quantity of a certain green shade, and that this particular style was unusually specky. I gathered up a quantity of the specks that had been taken from the cloth, and found that they contained the same telltale substance as the flocks gathered from beneath the press, and by putting some of it between folds of paper and running through the press, an oily spot on the paper resulted, which proved that there was a liberal quantity of grease in the specks, and that the specks were the result of the grease, which was the immediate cause of the imperfect carding that produced them.

At about this time the superintendent asked me if I could by any means get a piece clean. I told him I could; but it would be with a soap that might affect the colors. In response he said, "Go ahead and let's see the result."

I selected one of the pieces having some of the green shade above referred to and washed it with a special soap. In the mean time I looked up some of this green wool in the stock room, and found it very uneven in color and badly felted from the boiling it had received in dyeing. Then I called to mind what I had seen when I passed through the dye house, namely, the boss dyer skimming from a batch of this green something that was gathering on the top of the dye liquor, which had a very greasy appearance. Putting this and that together, I concluded that the wool had not been properly scoured, which necessitated extra boiling in the endeavor to set the color, putting the wool in a condition that resulted in the specks as well as having the grease boiled into it. The cleaner part took the color fairly well while much of it was slightly stained, only to wash out before the grease could be started.

To cap the climax, the piece which was scoured over came out with a white thread where it was green at the start. It was a pin check of tan and robin's egg green, and it came out tan and white, proving what I had suspected—that the color would not stand a soap that would remove the grease. I showed the piece to the superintendent, and at the same time told him of the result of my investigation and gave him a smell of the greasy flocks I had found beneath the press. He at once agreed with me that it was a decidedly "sheepy" smell, and opened his eyes to the real trouble.

It developed that at about the time they went on to this class of work, a wool scourer who knew his business had left, and a young man who had substituted occasionally was put on the job. He had always done well before, so there was no thought that there would be any trouble with him on the job. But when it came to changing from the coarser wool, that shrunk about 40 per cent. to the finer grade, with a shrinkage of above 60 per cent., he did not know how to adjust his scouring liquor to suit the new wool. So it had gone along in the same old rut, with the consequences above cited. A change in

this department of the work brought the desired results, and the cloud of suspicion that had hung over the finishing department disappeared. The scouring was then done so that the stock was clean and the color go on evenly and "stay put". The finishing room had no further trouble with dirty goods.

Dye Recipes

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 85

YELLOW ON UNION CLOTH (COTTON AND WOOL)

Union Yellow No. 2010 on 100 lbs. cotton and wool union cloth. Prepare the dye bath with

2 lbs. Union Yellow No. 2010.
(Innis Speiden & Co., 46 Clift St., New York.)
40 lbs. Glauber's Salt (Crystals).

Enter at 100° F., work at this temperature for 20 minutes, then raise to a boil, and boil 20 minutes. Shut off heat and allow to cool in the bath for 20 minutes.

Union Yellow No. 2010, when applied by this method, will be found to be an excellent color for the dyeing of cotton and wool union material.

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Recipe No. 86

GREEN ON UNION CLOTH (COTTON AND WOOL)

Union Green No. 1940 on 100 lbs. union cloth (cotton and wool). Prepare the dye bath with

2 lbs. Union Green No. 1940.
(Innis Speiden & Co., 46 Cliff St., New York.)
40 lbs. Glauber's Salt.

Enter at 100° F., work at this temperature for 20 minutes, then raise to a boil, and boil 20 minutes. Shut off heat and allow to cool in the bath for 20 minutes.

Union Green No. 1940, when applied by this method, will be found to be an excellent color for the dyeing of cotton and wool union material.

Recipe No. 87

RED ON WORSTED YARN

Fast Red A N S X on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Fast Red A N S X.
(Badische Co., 86 Federal St., Boston, Mass.)
4 lbs. Sulphuric Acid.
15 lbs. Glauber's Salt.

Enter at 140° F., and dye at a boil for one hour.

Fast Red A N S X is a very level dyeing color posessing very good fastness.

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Recipe No. 88

BLUE ON WORSTED DRESS GOODS

Blue on 100 lbs. worsted dress goods. Prepare the dye bath with

1 oz. 192 gr. Amazo Brilliant Blue R.
7⅓ ozs. Amazo Violet 12B.
(American Dyewood Co., 80 Maiden Lane, New York.)
2 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter at about 120° F., raise to a boil in 20 minutes. Boil about 3/4 of an hour or to shade.

The above colors are noted especially for their level dyeing properties and good fastness to light and are recommended for all classes of wool dyeing.

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Recipe No. 89

BLACK ON COTTON YARN

Thion Black B Extra Conc. on 100 lbs. cotton yarn.

Prepare the dye bath with

11 lbs. Thion Black B Extra Conc.
(Kalle & Co., 530 Canal St., New York.)
11 lbs. Sodium Sulphide (Conc.).
5 lbs. Soda Ash.
30 lbs. Common Salt.

Dissolve the dyestuff with the sodium sulphide, then add the dye solution to the dye bath, which already contains the other ingredients.

Enter yarn at 180° F., and dye at a boiling temperature for one hour, keeping the yarn below the surface of the liquor as much as possible. After dyeing the yarn may be softened by working for one-half hour in a warm soap bath 140° F., to which a little olive oil has been added.

Thion Deep Black R Extra Conc. possesses the characteristic fastness of the sulphur colors.

Recipe No. 90

ORANGE ON COTTON YARN

Diamine Aldehyde Orange G on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Diamine Aldehyde Orange G.
(Cassella Color Co., 182 Front St., New York.)
40 lbs. Glauber's Salt (Crystal).

Dye at a boil for one hour, then aftertreat in a bath made up with

3 lbs. Formaldehyde.
½ lb. Potassium Bichromate.
1 lb. Acetic Acid.

Diamine Aldehyde Orange G possesses good fastness to washing.

Recipe No. 91

VIOLET ON COTTON YARN

Benzo-Azurine 3 R on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Benzo-Azurine 3 R.
(Geisenheimer & Co., 189 Front St., New York.)
40 lbs. Glauber's Salt (Crystal).

Enter at 180° F., and dye at a boil for one hour.

Benzo Azurine 3 R possesses properties characteristic of the direct cotton colors.

Recipe No. 92

RED ON COTTON YARN

Chlorazol Brilliant Bordeaux R H on 100 lbs. cotton yarn. Prepare the dye bath with

3% Chlorazol Brilliant Bordeaux R H.
(Read Holliday & Sons, 11 Gold St., New York.)

Dye in the usual way for direct cotton colors. This shade possesses excellent fastness to light, washing, leveling and solubility.

Recipe No. 93

BROWN ON WOOLEN YARN

X L Brown R H on 100 lbs woolen yarn. Prepare the dye bath with

3 lbs. X L Brown R H.
(Read Holliday & Sons, 11 Gold St., New York.)

This is a homogeneous acid brown and is dyed in the usual manner. Its fastness to light, milling, leveling and solubility is excellent.

X L Brown R H should not be dyed in too strong an acid bath or the shade will come out brighter and yellower, thus 3 per cent. shade dyed with 5 per cent. D O V comes out brighter and yellower than one dyed with 3 per cent. D O V.

Recipe No. 94

GREEN ON COTTON YARN

Katigen Green 2 G K on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Katigen Green 2 G K.
(Farbenfabriken of Elberfeld Co., 117 Hudson St., New York.)
10 lbs. Sodium Sulphide (Crystals).
8 lbs. Soda Ash.
80 lbs. Glauber's Salt (Crystals).

Dissolve color with sodium sulphide and add solution to dye bath contaning required amount of soda ash and Glauber's Salt.

Enter at 180° F. and dye at temperature just below the boil for one hour.

Katigen Green 2 G K possesses good fastness in general.

Recipe No. 95

BLACK ON WORSTED YARN

Kresol Black X 4 B on 100 lbs. worsted yarn. Prepare the dye bath with

7 lbs. Kresol Black X 4 B.
(Geisenheimer & Co., 189 Front St., New York.)
20 lbs. Glauber's Salt (Crystal).
5 lbs. Formic Acid.

Enter at 140° F., raise slowly to boil and dye at a boil for 3/4 hour. Then add

2 lbs. Sulphuric Acid

and continue the boiling 3/4 hour longer to exhaust the dye bath.

Kresol Black X 4 B in addition to being an excellent black for straight wool dyeing, is also suitable for union dyeing.

Recipe No. 96

GREY ON WORSTED DRESS GOODS

Grey on 100 lbs. worsted dress goods. Prepare the dye bath with

3⅕ ozs. Amazo Blue.
2⅖ ozs. Amazo Brill. Red 2 B.
1 oz. 402 Gr. Amazo Fast Yellow L R.
(American Dyewood Co., 80 Maiden Lane, New York.)
2 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter at 120° F., raise to boil in 20 minutes and boil 3/4 hour or to shade.

The colors used to produce the above shade are of very good fastness to light and have excellent leveling qualities, making them very suitable for all classes of wool dyeing.

New Machinery and Processes

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to the textile manufacturers. It is not a list of patents but of improvements on the market, the idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.

Whenever possible we endeavor to make a personal investigation of the new machinery and processes described in this department. In the absence of such personal investigation we must necessarily rely upon information obtained from those who control the machines and processes.

We invite machine builders and others to send us such information for this department.

Press for Knit Goods. The American Laundry Machinery Co., Rochester, N. Y., is bringing out a new automatic press for underwear and similar knit goods. It is operated by electric motor and the operator controls it by a foot treadle. The goods are pinned, or laid, on a special frame, made of hollow tubing, to which a sheet of canvas is tightly laced. These frames are 40 in. by 40 in. in size. A number of them are furnished with the machine. A frame, containing the goods, is placed on an extended arm of the machine, the operator touches the foot treadle and the frame is carried to the center of the press underneath the steam heated chest. When it is in the correct position the pressure is automatically applied to bring the goods in contact with the steam heated chest. Meantime, a new frame is placed on the arm, the foot treadle is pressed again, the pressure is released on the goods underneath the steam chest and the frame containing the pressed goods is carried to an extended arm on the other side of the machine, while at the same time the new frame, containing the goods to be pressed, is carried forward to the steam chest. There is provision made for automatically governing the length of pressing, special gears being furnished to meet the varying time requirements. They are built in sizes with bed 30 by 72 in. and 36 by 60 in.

Grinding Bur Cylinders. Dronsfield Bros., Ltd., Oldham, England. An improved machine for grinding bur cylinders and straightening the teeth. A description appears in this issue.

Angle Steel Trucks. The Angle Steel Stool Co., Otsego, Mich., are placing on the market an improved steel truck, which is described in this issue.

Knitting Machine. The Standard Machine Co., 340 North Twelfth St., Philadelphia, has brought out a new model seamless hosiery machine, known as "Standard G". The cam cylinder is inside the needle cylinder. The machine runs at a very high rate of speed and its construction is simple. It produces a high grade of hosiery. A demonstrating machine is in operation at the above address and can be seen running at any time.

Velvet Attachment for Looms. The Societe Francaise du Noveau Velours, 26 Boulevard Bonne-Nouvelle, Paris, France. An attachment for weaving pile fabrics on an ordinary loom. It is said to be in successful operation in France.

Loop Wheel Knitting Machine. G. Stibbe & Co., Leicester, England, have recently placed on the market an improved model of the Fouquet French loop wheel knitting machine. One of the claims made is the capacity for making perfect work from low grade yarn.

Cloth Shearing Machine. Robert Hall & Son, Bury, England. An improved shear for fustian and velvets.

Tension Device for Cloth. W. H. Harrap, Manchester, England. An automatic tension device for mangles, calenders, steaming machines, etc.

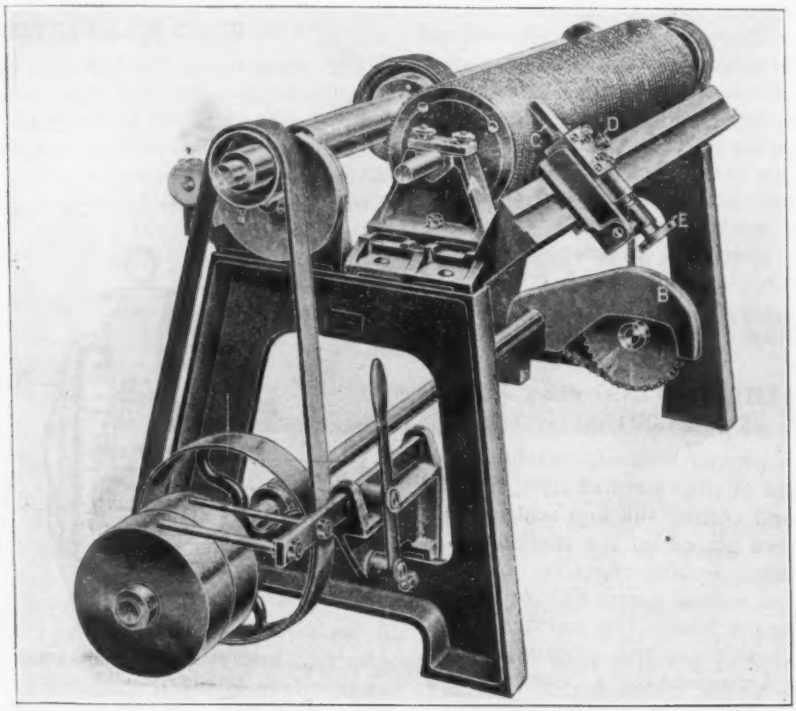
Hosiery Knitting Machine. T. Grieve & Co., Leicester, England, have recently placed on the market an improved seamless hosiery knitting machine.

A GRINDING MACHINE FOR BUR CYLINDERS

The illustration shows a machine built by Dronsfield Bros., Ltd., Oldham, England, for grinding and straightening the teeth of bur cylinders on first-breaker cards. The importance of keeping these cylinders in good order is known to all carders. If the teeth are dull or bent the card cannot do good work. The bed or rail carries an adjustable pedestal, A, in which is placed the bur cylinder, this being secured by hand clamps, and revolved at the correct speed by encased gearing, B, driven by a belt from the pulley shown, which is the one usually employed on the roller. The grinding is performed by a specially strong grinder, similar in detail to the well known Dronsfield patent traverse wheel grinder, which is fitted with a disc adapted for and covered with special emery filleting, which can easily be renewed when required. A positive traverse is given to the grinding disc through a differential motion. The disc grinder is driven from the bottom shaft as shown, and is carried by a patent center-setting motion, being set up to the taker-in roller by an arm wheel.

The dressing, stretching, cleaning and lining up of the teeth are performed by a simple tool, C, of special construction. This tool is made of case-hardened steel, and is very easily fixed in the carriage, so that it can be instantly changed to suit a different pitch or spacing of the wire. The tool carriage is mounted on the bed, and slides freely from end to end of the taker-in roller. The tool adjustment is of a compound character, allowing the tool, C, to be set deeper by aid of the thumb-screw, D, or to be moved up and down by the wheel, E.

In operation the tool carriage is drawn to one end of the bur cylinder and the tool pushed into the teeth, which immediately



THE DRONSFIELD PATENT GRINDING AND DRESSING MACHINE

causes the tool carriage to be slid across the bed, the tool thus stretching and lining up the teeth of the roller. The tool is then raised by hand free from the teeth, and the carriage drawn back again along the bed. This is repeated a few times, on each occasion the tool being lowered into the teeth by the thumb-screw, D, until the teeth are all straightened and in alignment. The grinding operation can be performed at the same time. The machine is simple, neat and self contained, and requires no special skill to operate it. It is fitted with fast and loose pulleys and belt guide, and occupies very little floor space. The grinding disc may be driven at 300 revolutions per minute. The makers claim that by its use old bur cylinders can be quickly made equal to new, thus saving the time and expense of sending them away to be refitted with teeth. The machine is supplied by any of the leading machinery importers.

A NEW PALMER ENDLESS FELT FINISHING MACHINE

Several improved finishing machines for the treatment of silks and half-silks, silk and wool, silk and cotton, silk and schappe fabrics have been placed on the market by A. W. Buhlmann, textile engineer, of New York. These include a new Palmer endless felt finishing machine. The features of the machine include a two-roll squeezing or impregnating arrangement, a compensating device and a Palmer tentering arrangement and dryer consisting of a large cylinder and endless felt. The sizing machine has two copper cylinders and a double bottom trough with a drying cylinder on top. A new disposition of the rolling-off arrangement permits a better supervision whereby one man can attend to the sizing machine as well as to the Palmer stretcher.

The construction of the disks is new. Each disk is independently adjustable and so arranged that its position can be regulated at the entering of the fabric without changing the exit. The cloth, after leaving the Palmer stretcher, enters immediately between the large drying cylinder and the endless felt, whereby a shrinkage in width is avoided. A smaller cylinder is arranged underneath the machine for drying the felt and a special mechanical device automatically keeps the endless felt in the middle of the machine.

All cylinders have riveted bottoms and are running in ball-bearings.

THE DIETZ MILL LANTERN

For years the use of kerosene oil in mills was forbidden by the insurance underwriters, owing to the danger of fire. This rule remained in force up to about ten years ago when the R. E. Dietz Co., Laight St., New York, introduced the Underwriters' mill lantern. The new lantern met with such a favorable reception that within a short time it replaced the Signal oil lantern that had been in general use. The difficulty with the new lantern, however, was that it gave a light of only 4 candle power. To overcome this objection the R. E. Dietz Co. introduced the "Blizzard" mill lantern that was made in two sizes, No. 1 giving a light of 6 candle power, and No. 2, shown in the illustration, a light of 10 candle power.

THE "BLIZZARD" MILL LANTERN

The Dietz "Blizzard" mill lantern represents the highest type of watchman's lantern on the market today. They are strongly constructed and embody every modern lantern improvement. The side tubes are se-

curely braced to the fount and the globe is protected by a heavy and well constructed wire frame. The lantern is arranged so that a padlock can be attached and by this means the light is protected in such a way that watchmen cannot interfere with it. Many insurance officials can point to factory fires that have had their origin in careless watchmen using lanterns to light pipes for an evening smoke. With the Dietz line of mill lanterns this is an impossibility. The lanterns are so constructed that they hold sufficient oil to burn from nineteen to twenty-three hours with one filling so that there is no occasion to interfere with the flame once the lantern is lighted and locked for the night. In addition to this, the Dietz "Blizzard" mill lanterns are so constructed that they stay lighted under the most exacting conditions. They will withstand sudden drafts and can be safely carried from one building to another at all times of the year. They give a brilliant white light.

The Dietz lanterns are fitted with an oil well that extends into the fount and very close to the bottom. If a lantern should accidently be knocked over, there would not be enough oil remaining in this well to run out and set fire. In fact, the lantern automatically goes out when it is tipped over. The entire line of Dietz lanterns was subjected to a thorough test by the inspection department of the Factory Mutual Fire Insurance Companies, of Boston, several years ago and minor changes were made at their suggestion. At the present time the line of mill lanterns meets with their full approval.

These lanterns have been on the market for many years, the company having been organized in 1840. The Dietz Company have contributed to the lantern industry every successful development that today is recognized as a standard or essential in lantern construction.

AN IMPROVED PORCELAIN JIG ROLL

The patent porcelain jig roll shown below, for which the Cell Drier Machine Co., Taunton, Mass., is agent, provides a substantial long-lived roll, into the surface of which the dye cannot soak. The old style roll becomes soaked with dye liquor, which when dyeing goods of the same or another color works out later. The roll consists of a steel shaft, made to any desired dimension, and a glazed earthenware cylindrical portion gripped between two cast-iron heads. Each head has a machined concave conical surface which fits perfectly a corresponding machined convex conical surface upon the end of the earthenware. This construction results in a perfect fit without the use of cement. No change in existing jigs or batch rolls is necessary.

A PATENT PORCELAIN JIG ROLL

These glazed earthenware rolls are in extensive use in Great Britain and on the Continent, and have been successfully introduced into the United States where many of the large plants have already adopted them as a standard. They are made in 7, 7 1/2 and 8 1/4 inch diameters, the latter being the size generally used. These rolls are handled in the United States by the Cell Drier Machine Co. of Taunton, Mass.

In England home-printed cottons were taxed 3 d (6 cents) per yard in 1702, which was increased to 6 d (12 cents) per yard in 1714.

In 1764 printing was established in Lancashire, Eng., in consequence of the cheapness of fuel, and of Lancashire being the country of the cotton manufacture.

ANGLE STEEL TRUCKS AND STOOLS

The transportation of products in process of manufacture from one part of the mill to another is a matter of much importance and if effected economically will result in a considerable saving. To accomplish this result the Angle Steel Stool Co., Otsego, Mich., have designed and built a number of different forms of trucks, one of which is shown at Fig. 1. They are made of steel throughout and mounted on roller bearing casters,

FIG 1

FIG. 2

making a very durable and serviceable truck. The Angle steel trucks are made to suit special requirements of different mills. In addition to the trucks the Angle Steel Stool Co. manufacture office and factory stools and chairs, one type of which is shown at Fig. 2. The frame work of these chairs is of steel with concave hard wood seats. A special turned and polished foot adapts the chairs for use on cement and tiled floors, polished wood or linoleum.

The products of the Angle Steel Stool Co. include sheet steel portable cans mounted on casters, which are very durable.

HOW A ROPE DRIVE REPLACED MITER-GEARED LINE SHAFT

By LEON BELLAMY, Dodge Mfg. Co., Mishawaka, Ind.

Several years ago the Dodge Manufacturing Company received a letter from the New Hartford (N. Y.) Cotton Manufacturing Company, asking to have a representative call and look over their power transmission machinery to make suggestions or recommendations for any changes which might seem advisable, and to quote prices on such work as should be decided upon. I visited the plant and found that they were using about 300 h. p., furnished by the combination of a Corliss engine and a water wheel, the latter carrying about 100 h. p. of the total load when a full head of water was available. The power house was located separately from the main building, leaving an interval of about 32 feet between, and the power had to be transmitted across this space. Fig. 3 shows the arrangement as I found it. The engine was running "under" and was belted to a pulley on a jackshaft in the basement. The water wheel was geared to the other end of this jackshaft.

The jackshaft being about 18 feet inside the power house wall and the mill lineshaft about the same distance inside the main building, there was a total space of about 68 feet, including the space between the buildings. Power from the jackshaft to the mill line was transmitted across this distance through a transverse shaft, with miter gears at the ends, as shown in Fig. 1. This cross shaft, with its bearings, was placed in a trench beneath the ground level between the buildings. I found that the gears had given a great deal of trouble by breaking, causing

shutdowns and large expense for replacements. They also were very noisy and could be heard a long way off.

The installation had originally been a good piece of work and had given satisfaction for a long time. In the course of time, however, the plant had grown considerably,

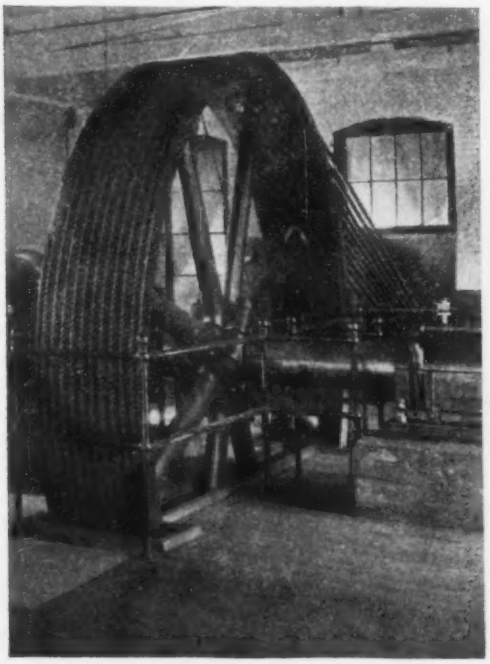


FIG. 1. DODGE ROPE DRIVE THAT MADE MOST ECONOMICAL WAY OF ELIMINATING OLD DIFFICULTIES

and the power required was greater than the outfit could economically handle. This caused a low efficiency, bad operation and a high cost of maintenance. After looking over the situation carefully, I suggested that the direction of rotation of the jackshaft be changed so that it might run in the same direction as the mill line. This change could be effected readily, so far as the water wheel is concerned, and advantageously for the engine. For the water wheel it was only necessary to reverse the position of the gear on the jackshaft. For the engine the reversal of direction enabled running it "over" instead of "under" as formerly. I advised then that the power from the jackshaft be transmitted directly to the mill line of a Dodge American system rope drive to pass through a tunnel beneath the ground between the power house and the mill.

Figs. 1, 2 and 4 show rearrangement in accordance with these suggestions. The rope drive was the most simple and economical way of eliminating the old difficulties and offered the most flexible and positive means of transmitting the power to the main building. We followed these suggestions with a drawing and detailed estimate of cost for the work, explaining the advantages of the Dodge system for using an endless manila rope on grooved sheaves with a trav-

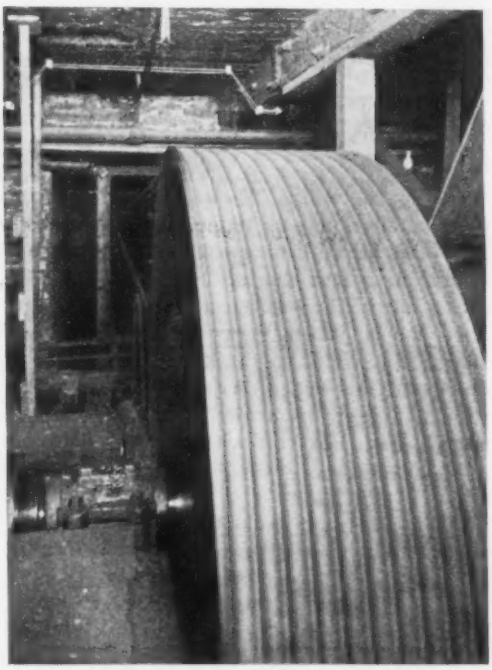


FIG. 2. DODGE ROPE DRIVE THAT OFFERED MOST FLEXIBLE AND POSITIVE MEANS OF TRANSMISSION

eling take-up to equalize the tension throughout the rope, so that each pulling strand could carry the same load. We also went into the question of efficiency, reliability, and low cost of maintenance for this system, and finally succeeded in securing the order, but not until C. F. Ogden, president, and R. E. Evans, general manager, had gone into the matter very thoroughly.

The changes were duly made and the operation of the new equipment was care-

fully watched. Comparison of tests made before and after the change showed that the new drive was running with a saving of about 20 per cent. of the total friction loss which existed continuously with the old equipment. The rope drive also gave more uniform speed, a matter of importance in

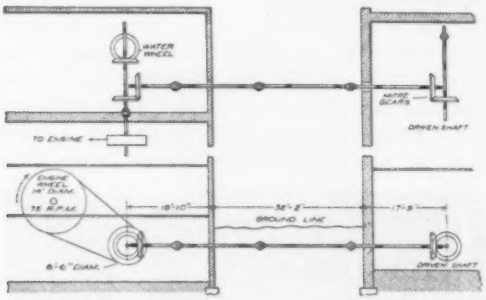


FIG. 3. THE OLD WAY. A MITER-GEARED SHAFT CONNECTION TO THE MILL.

every textile mill. About two years after this installation was made, the New Hartford folks found it necessary at another place to put in a new engine of larger capacity. This time we had no trouble in landing the order for a 400 h. p., rope drive from the engine fly wheel to the driven shaft. Our receipt of this order was due entirely to the excellent showing made by the first equipment, which has run without shut-down or

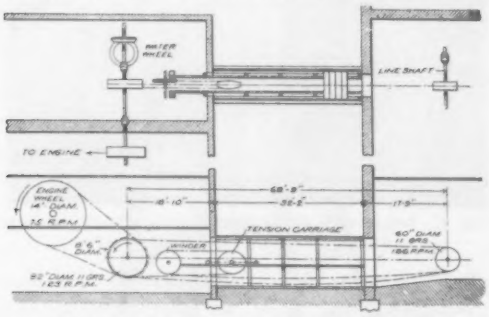


FIG. 4 THE NEW WAY. A DODGE ROPE DRIVE THROUGH A TUNNEL

any trouble whatever for a period of more than two years.

The first installation was made in the summer of 1905, the second in the summer of 1907. The drives are operating with the original ropes, both of which are still in good condition and give no reason to doubt that they will run for several years more. Writing some time since to the Dodge Manufacturing Company, the New Hartford Company said, "When we installed our new engine in the fall of 1907, we determined upon a rope drive for transmission because of the results obtained from our first installation. We placed a new engine so we could drive directly upon the main shaft to the mill, instead of driving indirectly, as we did from the old engine, and have had all sorts of power transmitted as well as from the absence of any trouble whatsoever with the drive."

SPINNING YARN

A method of spinning yarn by which the yarn is wound on the bobbin in two directions has recently been patented and is described by the inventor as follows: A shuttle has been equipped with means to sever the yarn when the reversal of the direction of the winding is reached. The filling carrier wound for use in connection with such a shuttle has a few winds laid in one direction, sufficient for one or more picks of the shuttle, across the lay, and the remaining winds of filling on the carrier were wound in a reverse direction. The mechanism operates in the loom with great accuracy and with entire satisfaction, but the practical objection to its extended use has been due to the fact that after the yarn has been spun upon a set of filling carriers in the usual manner, it must be rewound upon a second set of filling carriers by means of a winding machine, in which the carriers are rotated first in one direction and then in the reverse direction. Heretofore it has not been possible to spin the yarn directly upon the yarn carrier with two windings in reverse directions, because the reversal of the winding reversed the twist in the yarn and thereby weakened and caused breakage of the yarn.

In the efforts to overcome the objections hereinbefore noted it has been discovered that by a simple manipulation of the filling carriers or bobbins in the spinning frame after the initial or primary winding of yarn

is spun the spinning of the secondary or final winding can proceed in a reverse direction, and without any alteration or variation in the twist of the yarn. It is thus possible to spin the yarn directly upon the filling carriers with two windings in reverse directions, but with the same twist, so that the yarn is of uniform strength throughout, and to spin the yarn on the ordinary ring spinning frame.

Fig. 1 is a view of a ring spinning frame showing the filling carriers set for the initial winding of the yarn; Fig. 2 is a similar view, but showing the filling carriers inverted and the spindles with their tips uppermost, Fig. 2. The frame is started up and the spinning operation resumed. A secondary or final winding of yarn is laid upon the bobbins until they are properly filled, Fig. 3, whereupon the operation is completed and the frame is doffed, the bobbins then being ready to be used in the loom. No change is made in the direction of rotation of the bobbins by this method, nor is there any alteration in the relationship between the various parts of the spinning frame as the yarn is delivered. It is customary to wind yarn with

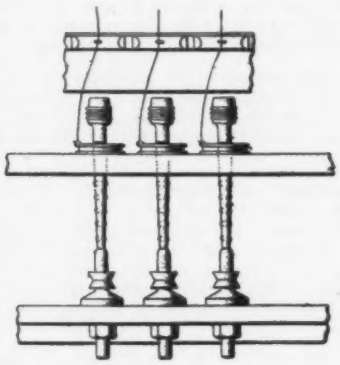


FIG. 1

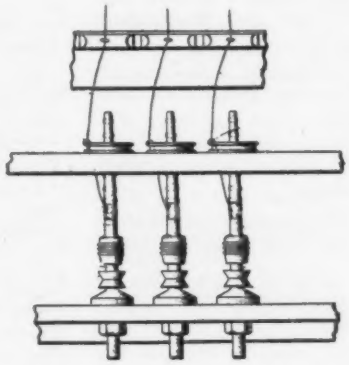


FIG. 2

FIG 3

in readiness for the secondary or final winding of the yarn, but before the rail is depressed. Fig. 3 is an enlarged view in elevation of a filling carrier with the two windings of yarn thereupon. The yarn is carried from the usual drawing rolls to the bobbin, and at 6 are shown rotating spindles mounted on the rail and provided with suitable whorls.

The bobbins are placed on the spindles with their butt ends uppermost, and the frame is started, with the ring-rail in proper position to lay a primary or initial winding, Fig. 1, of yarn upon the bobbin at the desired distance from the butt end. A suitable amount of yarn is so wound, sufficient for one or more picks of the shuttle across the lay, and then the frame is stopped. The frame is doffed to remove the partly wound filling carriers from the spindles, and the bobbins turned end for end, and replaced on the right hand wind, and it is so laid upon the bobbin for the primary winding, but when the filling carrier is removed from the spindle and inverted the yarn will have the left hand wind. The secondary winding is laid with the right hand wind and it so remains, but the inversion of the bobbin between the initial and final windings causes the windings to be laid with the wind in reverse directions. As there is no change in the direction of rotation of the spindle or in the lead of the yarn from the ring to the filling carrier, there is no change or variation in the twist, either as to its direction or amount. In consequence the twist of the yarn is uniform from the beginning to the end of the operation of spinning.

In 1700 the imports of printed fabrics from India into England was prohibited by Parliament.

Personals

Franklin W. Hobbs, president of the Arlington Mills, and formerly president of the National Association of Cotton Manufacturers, was awarded a degree of Master of Arts at the hundred and forty-fourth annual commencement exercises of Dartmouth College.

Henry Hammel has accepted the position of overseer of carding at the Bound Brook Woolen Mill, Bound Brook, N. J., succeeding Jacob Ashler, who has held this position for the past two and one-half years. Mr. Hammel comes from Jefferson, Mass.

William Stuart has accepted the position of overseer of finishing at the Fabyan Woolen Co., Quinebaug, Conn. He comes from Bennington, Vt.

M. H. Shea, overseer of weaving at the Sawyer, Regan Co., Dalton, Mass., has severed his connection with that company.

Frank R. Houseman, superintendent of the Aetna Mills, Watertown, Mass., has severed his connection with that company.

J. M. Masson has been appointed superintendent of the Peerless Woolen Mills, Rossville, Ga.

Richard H. Fish has accepted the position of overseer of weaving at the Barnard Manufacturing Co., Fall River, Mass.

William L. Mitchell has accepted the position of overseer of carding at the Versailles Sanitary Fibre Mills, Versailles, Conn.

William Grindrod has accepted the position of overseer of weaving at the Uncasville Manufacturing Co., Uncasville, Conn. He comes from Norwich, Conn.

Thomas A. Grieves has been appointed designer at the Continental Worsted Co., Providence, R. I.

John J. Connell, agent of the Tremont & Suffolk Mill, Lowell, Mass., has tendered his resignation to take effect August 1, after forty-three years of active engagement. It is reported he will remove to his home in New Berlin, N. Y.

James Marshall has been appointed superintendent of the A. L. Sayles & Sons Mill, Pascoag, R. I., succeeding William C. Damon. Mr Damon has been appointed manufacturing agent of this mill.

James Hall has succeeded James F. Syme as superintendent of the Saxonville Mill, Saxonville, Mass. Mr. Hall was formerly employed at the Rathbun Knitting Co., Woonsocket, R. I.

John J. Lenahan, overseer of finishing at the French River Textile Co., Mechanicsville, Conn., has resigned to accept a similar position with the Richardson, Foster Co., Central Falls, R. I.

James Dushame, overseer of finishing at the Richardson, Foster Co., Central Falls, R. I., has severed his connection with that company.

Charles H. Pickles has accepted the position of overseer of finishing at the Rochdale Mills, American Woolen Co., Rochdale, Mass. He was formerly employed in a similar position at the Oneko Mill, New Bedford, Mass.

James P. Ryan, overseer of finishing at the Rochdale Mills, American Woolen Co., Rochdale, Mass., has severed his connection with that company.

W. A. Booth has accepted the position of overseer of weaving at the Sawyer, Regan Co., Dalton, Mass. He was formerly employed at the Aetna Mill, Watertown, Mass.

Felix Noel has accepted the position as overseer of spinning at the Manchaug Co., Readville Cotton Mill, Readville, Mass. He was formerly employed at the Fort Dummer Mill, Brattleboro, Vt.

Ernest J. Geissler, formerly overseer of spinning at the Hartford Carpet Corporation, Thompsonville, Conn., sailed for his old home in Germany on Tuesday, June 17. The overseers, with whom he had been associated, presented him with a beautiful solid gold watch fob suitably engraved. He intends to spend a few months in the old country.

William H. Mitchell, for the past year and one-half overseer of carding at the Totokett Manufacturing Co., Versailles, Conn., has resigned. He is succeeded by A. R. Boutilier, who formerly held this position.

James E. Hathaway has been appointed superintendent of the Danielson Cotton Mill, New England Cotton Yarn Co., Danielson, Conn. He was formerly employed at the Southbridge Printing Co., Southbridge, Mass. He was presented with a gold watch and chain as a token of the esteem in which he was held, the presentation being made by treasurer Frank Hartley.

Matthew A. Rawlinson, agent of the Chicopee Manufacturing Co., Chicopee Falls, Mass., has tendered his resignation to accept a similar position with the Tremont & Suffolk Mills, Lowell, Mass., succeeding John J. Connell.

Charles Fletcher has been appointed superintendent of the Plainfield Woolen Co., Central Village, Conn. Mr. Fletcher is the son of Joseph Fletcher, who owns and operates this mill.

James H. Bragg, formerly overseer of carding at the Iroquois Mill, U. S. Worsted Co., Saugus, Mass., has accepted a similar position with the Brampton Woolen Co., Penacook, N. H.

W. A. McCormick, treasurer of the Eagle Dye Works, Pawtucket, R. I., has severed his connection with that company on account of ill health.

Fred Arpin, overseer of spinning at the Plainfield Woolen Co., Central Village, Conn., has resigned to accept a similar position with the Windham Manufacturing Co., South Windham, Me.

Harry Swift has been appointed master mechanic for S. Slater & Sons, Inc., Webster, Mass., succeeding William S. Pepler.

Z. E. Booth, for the past twelve years assistant treasurer and credit manager for the New England Cotton Yarn Co., Taunton, Mass., has severed his connection with that company.

George Keniston, for a number of years overseer of the spinning department at the Turner's Falls Cotton Mills, Turner's Falls, Mass., has resigned. He is succeeded by James H. Seaman, who comes from Holyoke, Mass.

William H. Roberts, overseer of the cloth department at the Booth Manufacturing Co., New Bedford, Mass., has severed his connection with that company. He was presented with a gold pin and cuff links by the help employed in his department.

Henry Williams has accepted the position of overseer of boarding at the Ipswich Mills, Ipswich, Mass., succeeding George A. Cooke.

John Mullen, assistant designer at the Blackinton Co., Blackinton, Mass., and Miss Margaret L. Hurst were married in Blackinton, recently. After a short wedding trip the couple will make their home in North Adams, Mass.

William F. Suydam has retired from the firm of Dexter, Lambert & Co., silk manufacturers, Paterson, N. J.

B. E. Connell has reentered the employ of the Faulkner Manufacturing Co., North Billerica, Mass., as overseer of weaving. He was formerly employed at this mill but later with the Somerset Woolen Co., Monson, Mass.

J. F. Henry, overseer of ring spinning at the Boston Manufacturing Co., Waltham, Mass., has resigned to accept a position in New York state. He is succeeded by Richard Walworth, who has had charge of the mule spinning. Mr. Walworth will now take entire charge of mule and ring spinning.

W. S. Warren, overseer of finishing at the Shawinigan Knitting Co., Ltd., Shawinigan Falls, P. Q., Canada, has severed his connection with that company.

M. A. Armitage has been appointed overseer of weaving at the Bigelow Carpet Co., Clinton, Mass., succeeding William H. King. Mr. Armitage comes from the Hartford Carpet Corporation, Thompsonville, Conn.

John E. Millett has been appointed overseer of weaving at the Somerset Woolen Co., Monson, Mass. He comes from Dayville, Conn.

Desire Besette has accepted the position of overseer of carding at the Joslin Manufacturing Co., Providence, R. I. He was formerly employed as second hand at the Bennett Mill, New Bedford, Mass.

A. J. Rollins has accepted the position of overseer of the cloth department at the Booth Manufacturing Co., New Bedford, Mass. He was formerly second hand at the Nashawena Mill, same city.

B. L. Ledwell, superintendent of the Knoxville Spinning Co., Knoxville, Tenn., has severed his connection with that company.

Edgar Eaton, overseer of ring spinning at the Grosvenordale Co., North Grosvenordale, Conn., has severed his connection with that company. He is succeeded by Thomas D. Crumley.

Charles R. Mee, overseer of dyeing at the Felters Co., Millbury, Mass., has resigned and is succeeded by Horace S. Ballard, who held the position of chemist for this company.

Robert E. Senior has accepted the position of overseer of carding and spinning at the Patchett Worsted Co., Keyser, W. Va. He comes from Webster, W. Va.

R. G. Thompson, manager of the Barre Wool Combing Co., Ltd., South Barre, Mass., has severed his connection with that company.

W. T. Davis has accepted the position of overseer of spinning at the Brazos Valley Mill, West, Tex. He comes from Bonham, Tex.

H. R. Riddle, formerly employed at the Brandon Mills, Greenville, S. C., has resigned to accept a position as overseer of spinning at Reedy River, S. C.

C. T. Sigmon has accepted the position of overseer of carding and spinning on the night shift at the Melville Manufacturing Co., Cherryville, N. C. He formerly held a similar position with the Belmont Mill at Shelby, N. C.

H. P. Puckett has accepted the position of overseer of carding on the night shift at the Holland Mill, Gastonia, N. C.

J. V. McCombs has been appointed superintendent of the Martel Mills, Egan, Ga. He was formerly employed as overseer of spinning at the Monaghan Mills, Greenville, S. C.

T. N. Crocker, overseer of carding at the Dunean Mills, Greenville, S. C., has resigned to accept the position of superintendent of the Lydia Mills, Clinton, S. C.

Walter C. Taylor has accepted the position of overseer of carding at the Dunean Mills, Greenville, S. C. He comes from Rockingham, N. C.

W. E. Smith, formerly overseer of the spooling and warping at the American Spinning Mill, Greenville, S. C., has resigned to accept a similar position at Belton, S. C.

T. S. Simpson has accepted the position of overseer of beaming at the Eagle & Phenix Mill, Columbus, Ga. He comes from Bessemer City, N. C.

W. B. Richardson has been appointed superintendent of the Edna Cotton Mill, Reidsville, N. C. He was formerly employed in a similar position at the Pickett Mill, High Point, N. C.

W. I. Henson has accepted the position of overseer of carding at the Merrimack Mills, Huntsville, Ala.

Henry Van Patten, formerly overseer of weaving at the Martel Mills, Egan, Ga., has resigned to accept a position at the Fulton Bag & Cotton Mills, Atlanta, Ga.

T. H. Fairchild, for the past four years superintendent of the Dixie Cotton Mills, Mooresville, N. C., has resigned.

James W. Cox, Jr., has been appointed general superintendent of the Albany Felt Co., Albany, N. Y., to fill the vacancy caused by the death of Duncan McCallum Fuller.

Joseph B. Jamieson, Jr., has been appointed general superintendent of the Grant Yarn Co., and the Fitchburg Yarn Co., Fitchburg, Mass.

F. A. Talbert, overseer of carding at the Verd Mont Mill, Ludlow, Vt., has resigned to accept a position at the Squamlake Woolen Co., Ashland, N. H.

George A. Hutchinson, overseer of ring spinning at the Warren Cotton Mill, Thorndike Co., West Warren, Mass., has resigned his position at that mill.

L. C. Hollingworth, superintendent of the Plainfield Woolen Co., Central Village, Conn., has severed his connection with that company.

Ryan Rosendale, manager of the Aitschuler Bros. Mill at Paterson, N. J., has resigned. He has associated himself with the firm of Buckner & Fischer, located in the Highland Mill with fifty looms for manufacturing broad silks.

Thomas Heatley, superintendent of the Taber Mill, New Bedford, Mass., has been appointed superintendent of the Seaconnet Mills, Fall River, Mass., to succeed Frederick E. Cunneen.

D. S. Knight has accepted the position of superintendent of the Wilton Woolen Mill, C. J. Amidon & Son, Wilton, N. H. He was formerly employed as overseer of weaving at the Faulkner & Colony Manufacturing Co., Keene, N. H.

Charles North has accepted the position of overseer of finishing at the Pequa Mills, Philadelphia, Pa. He was formerly employed at the Livingston Worsted Co., Washington, R. I.

M. E. Driscoll, who for fifteen years was superintendent of the Raritan Woolen Mills, Raritan, N. J., has again entered the employ of this company in a similar capacity.

Herbert G. Beede has been elected president of the Fort Dummer Mill, Brattleboro, Vt., to succeed George L. Dunham, who resigned on account of business interests. Mr. Dunham was elected vice-president to succeed Malcolm G. Chace.

W. C. Rose, formerly with the Nonotuck Silk Co., with whom he was financial man and accountant, has accepted a similar position with the American Knitting Mills Co., at their New York office, where he succeeds Charles Wells. Mr. Wells has been appointed general manager of Hammer Bros., St. Louis, Mo.

Charles N. Cook, manager of the Slatersville Finishing Co., Slatersville, R. I., has severed his connection with that company.

Thomas E. Foley has accepted the position of overseer of spinning at the Mianus Manufacturing Co., Coscob, Conn. He comes from Lowell, Mass.

F. H. F. Ballou, overseer of finishing at the Fidelity Finishing Works, Philadelphia, Pa., has severed his conneection with that company.

David Welch has accepted the position of overseer of finishing at the Fidelity Finishing Works, Philadelphia, Pa.

J. C. Stickler, president of the Onalaska Woolen Manufacturing Co., Onalaska, Wis., has retired, selling his stock to J. C. Robb, secretary and treasurer.

Harry Bentley, for many years employed with the John & James Dobson Co., Philadelphia, Pa., has severed his connection with that company.

George S. Asquith, Jr. has accepted the position of overseer of carding at the Hanover Woolen Manufacturing Co., Hanover, Ill.

Dewitt C. Davenport has accepted the position of finishing at the Hanover Woolen Manufacturing Co., Hanover, Ill.

John G. Gault has accepted the position in charge of the tape and braid department of the Hoffmann-Corr Manufacturing Co., Philadelphia, Pa.

H. E. Cheswell has been appointed superintendent of the Gainsville Cotton Mills, Gainsville, Ga.

George H. Riddle has been appointed superintendent of the Inverness Mills, Winston-Salem, N. C. He was formerly overseer of weaving and assistant superintendent of the Patterson Mills, Roanoke Rapids, N. C.

J. C. Foster, overseer of spinning at the Hartsville Cotton Mills, Hartsville, S. C., has accepted a similar position with the Vardry Mills, Greenville, S. C.

H. Lee Dearman has been appointed superintendent of the Dixie Mill, Mooresville, N. C. He was formerly employed at the Lakeside Mill, Burlington, N. C.

W. T. McBroom has accepted the position of overseer of carding at the Rossville Mills, Rossville, Ga. He comes from Barnesville, Ga.

R. L. Lefort has accepted the position of overseer of finishing at the Minneola Mills, Gibsonville, N. C.

J. S. Linder has accepted the position of overseer of weaving at the Alexander City Cotton Mills, Alexander City, Ala. He comes from Social Circle, Ga.

B. L. Amick, overseer of spinning at the Chadwick-Hoskins Co.'s mill at Charlotte, N. C., has been appointed superintendent of the Barringer Manufacturing Co., Rockwell, N. C.

M. B. Boseman has accepted the position of overseer of carding and spinning at the Bladenboro Cotton Mills, Bladenboro, N. C. He comes from Lumberton, N. C.

J. A. Campbell has accepted the position of overseer of spinning at the Glenn-Lowry Manufacturing Co., Whitmire, S. C. He formerly held a similar position at the Clinton Cotton Mill, Clinton, S. C.

S. J. Webb has been appointed superintendent of the Coosa River Spinning Co., Bon Air, Ala. He was formerly employed in a similar position with the Lumberton Cotton Mills, Lumberton, N. C.

W. F. Rogers has accepted the position of overseer of spinning at the Enoree Manufacturing Co., Enoree, S. C. He was formerly employed as overseer of carding and spinning at the Pelham Manufacturing Co., Pelham, Ga.

John F. Scott has been appointed superintendent of the Pickett Mills, High Point, N. C. He comes from Bessemer City, N. C.

C. E. O'Pry, superintendent of the Vardry Mills, Greenville, S. C., has accepted a similar position with the Knoxville Spinning Mills, Knoxville, Tenn.

W. R. Coggins, overseer of spinning at the Woodside Mills, Greenville, S. C., has resigned to accept a similar position at the Clinton Cotton Mills, Clinton, S. C.

B. C. Bertrand has accepted the position of overseer of spinning at the Monaghan Mills, Greenville, S. C.

Joseph Edmonson has been appointed general manager of the Barre Wool Combing Co., Ltd., South Barre, Mass., succeeding R. G. Thompson.

J. McDonald, superintendent of the spinning mill of the I. E. Palmer Co., Middletown, Conn., has resigned. His successor is Dillon Earon.

William Park, overseer of dyeing at the Forestdale Manufacturing Co., Forestdale, R. I., has resigned. He has been succeeded by C. L. Gillette.

Harry Bailey has been appointed superintendent of the Farwell Mill, Lisbon, Me.

Dillon Earon has been appointed superintendent of the mills of the I. E. Palmer Co., Middletown, Conn. He was formerly overseer of carding at Eagleville, Conn.

Vernon Lamoreaux, for years head of the shipping department of the Merrill Silk Co., Hornell, N. Y., has resigned to accept the position of general superintendent of the Niagara Silk Co., at North Tonawanda, N. Y.

Raymond A. Rice, who for the past seven years has been assistant superintendent of the Southbridge Printing Co., Southbridge, Mass., has been appointed superintendent.

Arthur C. Brown has been promoted from superintendent to agent of the Falls Co.'s mill at Norwich, Conn., to succeed Robert A. Smith.

B. Pierce Taber, for several years bookkeeper at the Arctic Mills of the B. B. & R. Knight Co., Riverpoint, R. I., has been appointed office manager at the Natick Mill, Natick, R. I., to succeed Aaron H. Watson. Harry Jacobson, assistant bookkeeper at the Natick plant, has been appointed to succeed Mr. Taber at the Arctic Mills office.

F. A. Talbert has reentered the employ of the Squam Lake Woolen Co., Ashland, N. H. He was formerly overseer of carding at the Verd Mont Mills, Ludlow, Vt.

Aaron H. Watson, who has been head bookkeeper at the mills of the B. B. & R. Knight Co., Natick, R. I., has resigned. He has accepted the position of manager of two mills of Arnold, Greene & Co., Hartford, Conn.

William F. Suydam, a member of the silk firm of Dexter, Lambert & Co., Paterson, N. J., has retired.

Francis X. Stone, overseer of weaving at the Lippitt Mill, B. B. & R. Knight Co., Phenix, R. I., has resigned. Theodore Potvin has succeeded Mr. Stone.

Edmund Clegg, overseer of spinning at the Dwight Manufacturing Co., Chicopee, Mass., has severed his connection with that company.

James H. Walsh has accepted the position of overseer of finishing at the Plainfield Woolen Co., Central Village, Conn.

Forest V. Adams, overseer of finishing at the Garland Woolen Co., Staffordville, Conn., has severed his connection with that company.

Jessie Towers, overseer of weaving at the Farwell Mill, Lisbon, Me., has severed his connection with that company.

Oscar H. Gledhill has accepted the position of assistant superintendent and designer at Mayo & Son's Mill, Foxcroft, Me. He formerly held a similar position with the Robert Dobson Co., Pioneer Woolen Mills, Pittsfield, Me.

Larry Fagan has accepted the position of overseer of spinning at the Glengary Mill, Oakland, R. I.

John Price has accepted the position of overseer of carding at the Walterboro Cotton Mill, Walterboro, S. C. He comes from Roanoke Rapids, N. C.

C. L. Upchurch has accepted the position of overseer of spinning at the Hamilton Carhartt Mills, Rock Hill, S. C. He was formerly employed at the Harriett Mills, Henderson, N. C.

Charles L. Snider, overseer of weaving at the Southside Mills, Winston-Salem, N. C., has been given charge of the dyeing and cloth room also.

A. B. Clements has accepted the position of overseer of weaving at the Brazos Valley Mill, West, Texas. He comes from Hillsboro, Texas.

W. S. Niles has been promoted to overseer of weaving at the Hillsboro Cotton Mills, Hillsboro, Texas.

Edward Buchanan has accepted the position of overseer of carding at the Wilson Cotton Mill, Wilson, N. C. He was formerly employed at the Musckogee Mills, Columbus, Ga.

It is reported that J. I. Westervelt, president and treasurer of the Westervelt Mills, Greenville, S. C., has resigned and that Frank Hammond has been chosen as his successor.

C. K. Quick has accepted the position of overseer of carding at the Jennings Mill, Lumberton, N. C., to succeed M. D. Pitman.

W. F. Chaffin has accepted the position of overseer of spinning at the Richmond Hosiery Mills, Rossville, Ga. He was formerly employed at the Standard Knitting Mills, Knoxville, Tenn.

C. L. Price has accepted the position of overseer of spinning at the Patterson Mills, Roanoke Rapids, N. C. He comes from Warrenton, N. C.

F. C. Hall has been appointed superintendent of the Lumberton Cotton Mills, Lumberton, N. C. He comes from Taunton, Mass.

C. D. Skidmore has accepted the position of overseer of spinning at the Wadesboro Cotton Mill, Wadesboro, N. C.

DEATHS.

Charles H. Plummer, formerly agent of the Great Falls Manufacturing Co., Somersworth, N. H., died at his home June 21. The news of his death was made known to the people of that city by the tolling of the mill bell and the placing of the flag at half mast. He was 71 years of age and was born in Somersworth. A wife and one son survive him.

J. P. Delehunty, founder of the Wyoming Valley Knitting Mills, Wilkesbarre, Pa., died recently at the age of 91 years. In 1874 he came to Pittston, Pa., and with E. L. Ellithrop as a partner, founded this mill. Shortly afterward he revolutionized the knitting industry by inventing a revolving cylinder knitter. He invented other devices for textile manufacturing, and the records at Washington show he was granted fifty-seven patents. In 1887 he retired from the knitting mills, and began the Delehunty Dyeing Machine Co., which makes a dyeing machine, which Mr. Delehunty patented.

Frederick G. Heine died at his home in Manchester, N. H., May 28, at the age of 72 years. He was born in Bremen, Germany. For the past twenty-five years he was overseer of weaving at the Devonshire Mill, Goff's Falls, N. H., having retired a few months ago. He is survived by a widow and two sons, Edward H. Heine, overseer of weaving, Waucantuck Mill, Uxbridge, Mass., and Fred J. Heine, overseer of weaving at the Huntington Manufacturing Co., Huntington, Mass. Two daughters also survive him. For a number of years Mr. Heine was overseer of the weaving department at the Chace Mill, now the American Woolen Co., Webster, Mass., before going to Goff's Falls.

J. J. Cook, of J. J. Cook & Co., New York City, died recently at the Hudson Street Hospital, at the age of 44 years. Death was due to enlargement of the arteries. For several years he had been agent for the Bailey Knitting Mills, Fort Plain, N. Y., and the Muldoon Underwear Co., Mohawk, N. Y., with offices at 366 Broadway, New York City.

Henry McMurtry, formerly superintendent of the Norfolk & New Brunswick Hosiery Co., New Brunswick, N. J., died recently in this city at the age of 83 years. He has been in the employ of the Norfolk & New Brunswick Hosiery Co. for thirty-eight years. Two daughters and three sons survive him.

George W. Smith, of D. R. Smith & Sons, manufacturers of cotton duck at New Hartford, Conn., died recently at the age of 64 years. He is survived by a son, Wellington B., and a brother, Darius Smith, members of the firm.

John G. Fellows, who was engaged in the cotton business for some time, died recently at Selma, Ala., at the age of 58 years. A brother and a sister survive him.

Ira Scharidan, manufacturer of ladies' ribbed underwear, formerly connected with the Scharidan Manufacturing Co., Harrisburg, Pa., committed suicide June 10 by drinking carbolic acid. Business troubles were responsible.

A. P. Sager, of Sager Bros., manufacturers of knit goods, Syracuse, N. Y., died recently at the age of 66 years. With his brother, George J. Sager, he succeeded to the knit goods business started by their father, Jacob Sager, immediately after the Civil War. He is survived by his brother and partner, George J. Sager, his widow, one son, Frederick W. Sager, also a member of the firm, and one daughter.

Mark D. Ring, of Mark D. Ring & Co., manufacturers of woolen and merino yarns, Third and Somerset Sts., Phialdelphia, Pa., died recently at the age of 56 years. For many years he was associated with the firm of Jonathan Ring & Son, but three years ago formed the company bearing his own name.

George W. Bean, for thirty-two years agent of the Androscoggin Mills, Lewiston, Me., died June 17, at the age of 78 years, after an illness of several months.

Joseph Holdworth, vice-president and manager of the Pitkin Holdworth Worsted Co., Passaic, N. J., died recently of pneumonia, at the age of 64 years. He had been ill but a short time.

George U. Clark, superintendent of the Mentor Knitting Mill Co., Erie, Pa., has severed his connection with that company.

Harrison Berger, founder of Berger Bros., Spring Garden Knitting Mill, Schuylkill Haven, Pa., died at his home in that city at the age of 75 years. He began the manufacture of hosiery in 1889 and afterwards added an underwear department. The hosiery business was discontinued in 1893. In 1907 Mr. Berger transferred his interests to his two sons and retired from active business.

Mill News

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires, facts and gossip of the trade are referred to the TEXTILE ADVANCE NEWS, issued weekly by the publishers of the TEXTILE WORLD RECORD, at $15.00 per year. Communications for this department are invited. There is no charge made for printing notices of new mills, enlargements, improvements, etc.

COTTON.

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New Mills.

*Canada, Quebec, Sherbrooke. The new Canadian-Connecticut Cotton Mills, Ltd., which was organized with authorized capital stock of $1,750,000 to build and operate a cotton mill in Sherbrooke, will manufacture only tire fabrics and paper mill cotton dryer felts. A complete report has been given previously and it has been noted that it is hoped to begin manufacturing about January 1, 1914.

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Enlargements and Improvements.

Alabama, Rock Mills. A new boiler has been installed in the Wehadkee Yarn Mills.

*Connecticut, Greenville. It has not been decided definitely by the Shetucket Company, manufacturers of ticking and denims, to build the proposed addition. They contemplate the erection of a new weaving mill.

Georgia, Atlanta. The Fulton Bag & Cotton Mills have awarded the contract to the General Electric Company for equipment for electric drive, including three transformers and eight motors ranging from 5 to 150 h. p.

*Georgia, West Point. New electric power equipment will be installed in the Lang Cotton Mills about August 1 and the present steam plant will be discontinued in part. The company was recently reorganized and the name changed from Lang Mfg. Company to Lang Cotton Mills. A. C. Smith is now president and buyer; Joe Heinzfeld, treasurer; and W. A. Reed, superintendent.

Maine, Waterville. The Lockwood Company has decided to build the new dam for which plans were recently completed. The new dam will be 885 ft. long, of reinforced concrete, and will take the place of a wooden structure.

Massachusetts, Holyoke. The American Thread Co. will place in operation in its power plant a new 1250 k. w. Curtis turbo-alternator complete with switchboard and control apparatus. The unit will be built and installed by the General Electric Company.

Massachusetts, Indian Orchard. Plans have been made for an addition to the factory of the Indian Orchard Company on Front St. The new structure will be of brick, concrete and steel construction, 60 by 100 ft., 1 story high. The Indian Orchard Company manufactures cotton warps, plain and colored fancy yarns, carded cotton, and dyes cotton yarns and raw stock.

Massachusetts, West Warren. The Warren Cotton Mills will install in their mills four new 75 h. p. motors, recently ordered.

Mississippi, Columbus. A contract has been placed by the Tombigbee Mills for 60 automatic looms. It is understood that other improvements are to be made.

New Hampshire, Manchester. Another story is being built on the wing of No. 5 mill of the Amoskeag Mfg. Company and will soon be ready for occupancy.

*North Carolina, Concord. The Cabarrus Cotton Mills will install new electric power equipment including a 75 and a 100 h. p. motor.

*North Carolina, Huntersville. Construction work has been completed on the addition to the plant of the Anchor Mills, which has been in course of erection since February, and within six weeks it is expected that machinery equipment will be installed. This new equipment will include 5,000 spindles, giving the company 10,250 spindles. The yarn department is operated day and night to supply the weaving department with yarn. This enlargement is being made in order to make night work unnecessary. Ginghams are manufactured.

*North Carolina, Kannapolis. Work is progressing on the addition to No. 1 mill of the Cannon Mfg. Company. In May, ground was broken for an addition to the weave room 120 feet long. More houses for operatives are being built and other improvements are contemplated.

North Carolina, Lawndale. Preparations are being made by the Cleveland Mill & Power Company to build a large dye house of brick construction, 185 by 75 ft., 2 stories high. An addition was recently built and equipped with twisting frames and ball winding machines. Carpet warps, twines, wicks and clothes lines are manufactured.

North Carolina, Randleman. The Deep River Mills, Inc., have closed for thirty days to facilitate the work of changing from steam to electric power.

North Carolina, Salisbury. The machinery equipment of the Vance Cotton Mills is being overhauled and repaired.

North Carolina, Siler City. Three new spinning frames have been ordered by the Hadley, People's Mfg. Company better to balance the equipment.

North Carolina, Taylorsville. The Watts Mfg. Company has plans to add 6,000 spindles to its equipment. Contracts for 2,000 spindles have been awarded. A conditional contract for a second 2,000 spindles has also been placed, this equipment to be delivered a little later. Cone winders also will be installed.

*Pennsylvania, Philadelphia. Verifying a report made by us several months ago, M. K. Kerkeslager has sold to Frederick Pearson & Co., Inc., manufacturer of plushes at Hancock and Somerset Sts., the mill building at Wilde St. and Leverington Ave., Manayunk, 422 by 294 ft. The purchase price has not been made public. The present assessment of the property is $15,000. The Pearson Company will remove its plant to Manayunk as soon as the buildings can be put in condition to receive the equipment.

Pennsylvania, Philadelphia. Francis Kelly, manufacturer of cotton and jute shoddies and cotton and woolen waste, at 1732 N. Hancock St., has recently contracted for alterations to his present plant to cost in the neighborhood of $1,800.

*South Carolina, Cowpens. Three new finisher pickers will be installed in the addition to the picker room of the Cowpens Mfg. Company, recently completed. This company manufactures sheetings on 17,360 ring spindles and 406 looms. J. W. Brown is president and buyer, H. M. Brown is treasurer, and C. A. Pender is superintendent. Electric power is used.

South Carolina, Darlington. It is reported the Darlington Mfg. Company has decided to replace its fancy and dobby looms now operating on fancy shirtings with automatic looms to weave plain goods. This matter has been under consideration for the past year and the change was considered by stockholders at a meeting last fall.

*South Carolina, Greenville. The Woodside Cotton Mills have arranged to install considerable new apparatus for electric drive, which will include three 300 kv-a., two 30 kv-a. and three 10 kv-a. transformers; and for power application throughout the mill, 51 motors ranging from 7.5 to 75 h. p. The order for this equipment has been placed with the General Electric Company. New machinery equipment is constantly arriving and being installed in the addition. A total of 27,000 new spindles and 678 new looms will be in operation before the end of September. Practically half a million dollars has been expended in the past year in enlarging and increasing this plant.

South Carolina, Yorkville. An addition is to be built to the Ancona Cotton Mills, formerly the York Cotton Mills, controlled by J. F. Cannon of Concord, N. C., and his father, J. W. Cannon. The addition will be 75 by 300 ft., and will be completed about October 1. It will be equipped with about 200 looms. The mill will also be changed from steam to electric power.

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Mills Starting Up.

Georgia, La Grange. It is reported that Howard P. Park, president and treasurer of the Park Cotton Mills, has completed plans for reopening the plant within the next few months. The Atlanta & West Point R. R. will build an additional track to the mill.

*Pennsylvania, Philadelphia. An application for a charter will be made for the Fox Chase Mills, with M. J. Meehan, James H. Craig and Edmund W. Kelso, as incorporators. This corporation, as reported by us several months ago, will operate the plant formerly run by Jos. H. Margerison, under the name of the Belmont Mills, located at Jarrett Ave. and Huntingdon Pike. The plant contains 28 looms which they will run on Turkish towels which they will dye and bleach. They are now making samples. The production will be sold direct.

WOOLEN.

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New Mills.

Connecticut, Unionville. Contract has been awarded by Charles W. House & Sons for a 3-story factory building, 65 by 120 ft., to be equipped for manufacturing felt novelties. This concern has been in the business of distributing felts for some years and it was reported a year or two ago that they contemplated manufacturing.

*New York, Waterford. A short time ago a report of the incorporation of the Waterford Woolen Company with capital stock of $20,000 was given and it was stated that a mill was being built. The concern will have three pickers and five cards, manufacturing shoddy, with dye house, steam power equipment, etc. Otto A. Saeltzer is the superintendent and buyer. Harry B. Brooks, formerly of the old Victor Knitting Mills Company of Cohoes is interested in this concern.

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Enlargements and Improvements.

*Canada, Ontario, Chatham. The T. H. Taylor Company, previously reported enlarging, has purchased some of the equipment of the Seneca Falls Woolen Mills, Seneca Falls, New York.

*Connecticut. Bridgeport. Work has been started on a new dye house for the Salt's Textile Mfg. Company. The building will be of brick and steel with concrete foundation. This is part of a plan for enlargements and improvements which include a new 3-story mill and a new 1-story weave shed with saw tooth roof. The plans were prepared by the Fletcher Engineering Company.

Connecticut, Rockville. There is considerable activity at the Windermere Mill of the Hockanum Mills Company, overhauling and repairing the property. It is not known whether the Hockanum Mills Company plan to utilize the mill for manufacturing or whether it is to be sold. A short time ago the Saxony Mill was sold by the Hockanum Mills Company to the James J. Regan Mfg. Company, who have made extensive changes and added new machinery and will soon begin the manufacture of woolen goods in the plant. The James J. Regan Manufacturing Company are now erecting a large brick addition to one of their other mills.

Connecticut, Stafford. A fifty-foot addition, the full size of the main mill, is being built by the Phoenix Woolen Company. The lower story is of brick and the balance of wood construction. They have installed one new dye kettle and will also put in one new dressing frame, which is all they contemplate doing at present. The improvement is expected to be completed about July 1. C. B. Pinney is vice-president and agent.

Maine, Wilton. It is reported the old mill of the Wilton Woolen Company, which has been shut down for some time, will be repaired during the summer and equipped with new looms before fall. New hardwood floors are to be laid and larger windows cut in the walls.

*Massachusetts, Caryville. In connection with the enlargement to the plant of the Taft Woolen Company, equipment for electric drive will be installed in the mills including a 150 kv-a. generator with 5 k. w. exciter, 7 motors ranging from 5 to 75 h. p., and switchboard. The equipment will be supplied by the General Electric Company. The enlargement is being built to increase the carding department and on the completion of this addition a rearrangement of the machinery will be made.

Massachusetts, Charlton City. The Aldrich Mfg. Company will enlarge their mill by an addition to the west side to be of wood construction, 24 by 25 ft. The new space will be used for making cotton warps. Cotton warp piece dyes are manufactured by this concern which has three sets of cards and forty-eight narrow looms. Thomas Ashworth is president and James Ashworth is treasurer, superintendent and buyer.

Massachusetts, West Rutland. The work of removing the machinery equipment from the Worcester plant of the Daniels Worsted Mills to the enlarged West Rutland mill has just been completed. The dyeing department was the last to be moved. It was reported some time ago that on the completion of the enlargement to the local plant, and the removal of the machinery here, the property in Worcester would be sold.

*Minnesota, St. Cloud. The enlargements and improvements at the St. Cloud Woolen Mills, which have been in progress since last November, when the property was taken over by the present owners, have been completed. A 2-story addition, 25 by 48 ft., has been built, a new roof put on the old mill, and the interior of the old mill remodeled to adapt it to new machinery which has been installed. Stephen Hall is the superintendent and buyer. Knitting yarns, blankets, flannels and lumbermen's socks are manufactured.

*New Hampshire Tilton. A. D. Carter, manufacturer of ladies' dress goods on 7 sets and 40 broad looms, is building a 3-story addition, 30 ft. long. All departments will be increased and 10 new looms will be added.

*New York, Amsterdam. The officers of Stephen Sanford & Sons, Inc., are John Sanford, president; William H. Cooper, vice-president, in charge of manufacture and operation; E. P. Truett, vice-president, in charge of finances and sales; William N. Kling, treasurer; William H. Sealey, secretary; A. R. Conover, counsel. The above named officers constitute the board of directors. The amount of capital stock is $6,000,000, of which $5,000,000 has been issued. It has been noted previously that the capacity and output of the mills will now be increased and that many of the smaller looms will be replaced and the manufacture of seamless rugs carried on more extensively. The present equipment includes 34 sets of wool cards, 7,800 mule spindles, 23 worsted cards, 12 worsted combs (Bradford), 8,640 worsted spindles, 40 cotton cards, 7,032 ring spindles, giving employment to 3,000 hands.

*New York, Amsterdam. The new dye house for Stephen Sanford & Sons, Inc., will be 257 feet long, 108 feet wide at one end and 55 feet wide at the other end, 5 stories high, and will contain approximately 104,000 square feet of floor space. The contract for the engineering work for building and equipping this new dye house has been awarded to Charles T. Main, engineer, of Boston.

Ohio, Cleveland. The Acme Woolen Mill Company is to enlarge its plant by the erection of a 2-story mill and has awarded the construction contract to the C. N. Griffin Company. The Acme Woolen Mill Company makes shoddies, extracts and cotton felts, operating 9 pickers, 6 sets of woolen cards, 6 garnetts. P. S. Green is president; C. P. Green, treasurer; H. J. Green, agent; C. A. Huttinger, superintendent, and W. R. Green, buyer.

Pennsylvania, Philadelphia. The W. & R. Ford Manfg. Co., manufacturers of woolen and worsted yarns, with 16 sets, 4,000 worsted and 2,600 woolen spindles, 3 combs and 2 cards, have placed a contract for alterations to their storage houses which will cost them in the neighborhood of $2,000.

Pennsylvania, Philadelphia. The contract for alterations to the plant of S. B. & B. W. Fleisher, located at Main and Rector Sts., Manayunk, has been given out and work will be commenced at once. The plant contains 20 combs, 16 cards and 12,000 worsted spindles, which they operate on worsted yarns up to 40s.

Pennsylvania, Philadelphia. A brick addition will be erected to the plant of John D. Grover & Sons, Somerset and Tulip Sts., scourers of wool and hair. The contract has been given out and the operation will be started at once.

Rhode Island, Centredale. Improvements are being made in the plant of the Centredale Worsted Mills, manufacturers of worsted yarns.

Rhode Island, Harrisville. Ground has been broken for an addition to the plant of the Stillwater Worsted Company which will be 100 by 60 ft., 2 stories high, of steel and brick construction. It will be used for finishing and shipping departments. A floor in the Wolff Worsted Mill was recently leased for burling and mending. The plant is in operation day and night and the new addition is necessary to meet the demands of the business of the concern. It will be ready for occupancy late in the summer.

Rhode Island, Washington. During the last week 20 additional looms have been put in operation by the Livingston Worsted Company. A new hydro-extractor has been installed in the finishing department to replace an old one.

Rhode Island, Westerly. Some changes are being made in the finishing department of the Paw-

catuck Woolen Mills. An overtime schedule is in force at this mill.

Rhode Island, Woonsocket. Work has been started on the foundation for an addition to be erected on the south side of the frame mill of the Guerin Spinning Company on Social St. The addition is to be 156 by 76 feet, two stories high, and is being built in order to increase the efficiency of the plant and give an increased production. Governor A. J. Pothier of Rhode Island is treasurer of this concern, and Joseph Guerin is president and manager.

Washington, Kirkland. George Matzen president and treasurer of the Matzen Woolen Mills, a new company which took over the old plant of the Seattle Woolen Mill Company last November, announces that the plant is to be enlarged. At the present time it is being operated on an overtime schedule. Mackinaws, blankets and woolen suitings are manufactured on two sets and fifteen looms.

Wisconsin, Burlington. Three new needle felt looms have been installed in the plant of the Burlington Blanket Company on Chestnut St.

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Mills Starting Up.

*California, Eureka. A new concern is being organized under the name of the Eureka Woolen Mills to take over the plant of the Humboldt Bay Woolen Mills Company. F. Carter, who has been reported as having an option on the property, will be general manager. Mr. Carter organized the Portland Woolen Mills at Portland, Oregon, about twelve years ago. The mill will be operated on heavy woolens for the Alaska trade and the mining and logging trade on the Pacific coast, and it is reported they already have sufficient orders to run the plant to full capacity. The carding and spinning departments are to be operated night and day and 20 additional looms are to be installed. This will make the plant, which contains 3 sets of cards and 20 looms, practically a 6-set mill in its production. The mill is modern and is equipped with electric power, piece dyeing and finishing departments, etc.

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Mills Shutting Down.

*Massachusetts, Athol. The Millers River Mfg. Company has discontinued manufacturing and arrangements have been made to dispose of the equipment. The building and water power were recently sold to L. S. Starrett, president of the Starrett Tool Company.

KNIT.

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New Mills.

Canada, Ontario, Toronto. J. M. Allen and K. W. Allen will begin manufacturing high grade infants' worsted hosiery, silk heel and toe, about July 1, under the name of Allen Bros. Quarters have been leased at 813 Gerrard St., E., and six knitting machines will be installed as initial equipment. Increases will be made as the business warrants it. The Messrs. Allen are both experienced mill men, J. W. Allen having recently given up the position of superintendent of the Fay Stocking Company of Elyria, O., to start in business for himself, and K. W. Allen has had charge of the spinning department of the Kavanaugh Knitting Company at Waterford, N. Y., for three years. The product of the new plant will be sold under the name of "Little Comfort" infants' hosiery.

*New Jersey, Medford. The new hosiery plant, which is a branch of the Powell Knitting Company of Philadelphia, is merely an experiment at present and was established at the request of the Board of Trade. The present location is temporary. Permanent quarters will be found if conditions prove satisfactory and the Board of Trade already has an option on permanent quarters. Twenty-five machines are being operated.

*New York, Brooklyn. The Full Fashion Silk Hosiery Company, Inc., has been granted a charter with capital stock of $200,000 to manufacture hosiery and gloves. The incorporators are Paul Del Gallego, Julian A. Arroyo, and T. C. Weydandt. It was noted some time ago that R. Del Gallego & Company, commission merchants at 59 Pearl St., New York City, would establish a full fashion hosiery mill. A location has been secured at 30 Main St., Brooklyn, and the new company will shortly begin manufacturing women's full fashion hosiery. Paul Del Gallego is a member of the firm of R. Del Gallego & Company.

New York, Clifton Springs. Charles M. Tinkham and Frank Daly will establish a knitting mill here. They are enlarging a barn on Crane St. owned by Mr. Tinkham and expect to install machinery in about a month.

*North Carolina, Efland. Organization has been effected by the Efland Hosiery Company recently reported incorporated with capital stock of $50,000, with M. P. Efland, president, Julian J. Brown, vice-president, and John L. Efland, treasurer. A mill is being built to manufacture hosiery and the equipment will include a steam power plant.

North Carolina, Hickory. C. Sherman Grove, formerly superintendent of the Maryville Hosiery Mills at Maryville, Tenn., and recently interested in establishing a hosiery knitting plant at Sequatchie, Tenn., will begin the manufacture of hosiery in Hickory in a few days under the name of the Best Knitting Mills. A building has been secured and will be equipped with 24 knitting machines and one sewing machine. Electric power will be used. At first men's half hose will be the sole product. Mr. Grove is the proprietor and will sell the product direct and through H. H. Sanders, New York.

New York, New York City. A new company is manufacturing infants' knit goods at 40 Penn St. under the name of the Infant Wear Knitting Corporation. Four knitting machines and two sewing machines are operated using 2/10s and 2/6s cotton yarns, bleached and mercerized, 2/22s, 2/26s worsted and also silk yarns. Hermocrates Parra is president, treasurer and buyer, and William Richardson is superintendent.

Pennsylvania, Tower City. Women's underwear is to be manufactured by W. J. Henry, who has recently placed an order for equipment for a plant of this kind.

Pennsylvania, Bethlehem. A line of high grade silk knitted neckwear is being manufactured here by Graham & Barnes. Samuel Graham, formerly manager of the Philadelphia Hosiery Co., is the active member of the firm in charge of the plant.

*Pennsylvania, Cambridge Springs. A certificate of incorporation has been granted the Cambridge Springs Knitting Company, recently reported as establishing a ladies' knit underwear plant in Cambridge Springs. The capital stock is $20,000.

*Pennsylvania, Philadelphia. The Alland Hosiery Co., reported by us several months ago as being started up by Allinson & Anderson at 1427 Catharine St., are manufacturing infants' and children's hosiery in cotton, mercerized and silk. The plant now contains 20 knitters and 4 loopers but will be augmented by the installation of a number of new machines during the coming fall when a line of children's ribbed hosiery will also be manufactured. J. E. Allinson is superintendent, J. M. Anderson, buyer, and the product sold through New York.

Pennsylvania, Philadelphia. Mercerized and silk knitted neckwear will be manufactured in a small plant being equipped by J. Pillet & Co., who are installing 6 knitters and 1 sewing machine in a portion of the building at 44 N. 4th St. The production will be sold direct to the jobbing trade. They will use 20, 40 and 60 mercerized and real and artificial silk.

Pennsylvania, Philadelphia. Messrs. Emil Joseph and Rubin Bros. are starting up the Bell Knitting Mills of Pennsylvania at 208 N. 4th St., where they have leased the fourth floor. They are installing 10 knitters and 6 sewing machines which they will operate on men's, women's and boys' sweater coats and fancy knit goods, for the jobbing and retail trades. They will use wool, worsted and cotton yarns. The plant will be in operation within the next ten days.

Tennessee, Coal Creek. The Coal Creek Business Men's League is organizing a company to establish a hosiery mill here and would like to interest a manager who would take $10,000 of the capital stock. The company will be capitalized at $50,000. M. H. Irwin, secretary of the Business Men's League, has the matter in charge.

*Tennessee, Dayton. Arrangements have been made to organize the projected hosiery mill. The company will be incorporated under the name of the Dayton Hosiery Mill Company with capital stock of $75,000 and a mill will be built to be equipped with $30,000 worth of machinery, electric power equipment, etc. The interest of Garnett Andrews of Chattanooga, Tenn. was secured by the local men who promoted the project and Mr. Andrews will be manager.

*Tennessee, Lawrenceburg. The branch mill which is being constructed for the May Hosiery Mills of Nashville is nearly completed.

Enlargements and Improvements.

California, Los Angeles. The Los Angeles Knitting Company has moved from South Park Ave. to 3512 San Pedro St., where more than double the former space has been secured. Sweater coats, bathing suits and novelties are manufactured. Emil Schultz is manager and Richard Gerisch is superintendent.

*Connecticut, Bristol. A. D. Hawley, vice-president and treasurer of the Bristol Mfg. Company, is quoted as saying that the business is greater at present than ever before in its history. It has been noted that plans for a 2-story brick addition to be located on Riverside Ave. have been made.

Georgia, Grantville. A new cotton warehouse has been built by the Grantville Hosiery Mills which has capacity of 500 bales. It is understood that other improvements are contemplated.

Illinois, Chicago. Additional knitting machinery equipment has been ordered by the Burkland Knitting Works, 2649 Sheffield Ave., manufacturers of infants' shirts.

Indiana, Fort Wayne. Five new full fashion knitting machines are in operation in the addition to the plant of the Thieme Bros. Company. These machines were imported from Germany and are part of an order for eighteen machines which will be installed in the addition.

*Illinois, Rockford. The B. Z. B. Knitting Company is installing twelve new knitting machines a week in the new 11-story mill. They now have 300 knitting machines in operation. Particulars of the new plant and the increases in equipment have been given previously.

*Massachusetts, Chicopee Falls. Work has been completed on the $18,000 addition to the plant of the Taylor, Bramley Company which was started in February. The new building is four stories high, 75 by 30 feet. Machinery equipment will be installed, including 20 new knitting machines and other machinery which will give employment to about 50 additional hands. The company manufactures high grade ribbed underwear for women, also infants' wrappers and abdominal bands and a new line will be added of an even finer grade of product than has previously been made.

*New Jersey, Beverly. The enlargements and improvements at the plant of the Beverly Underwear Company, manufacturers of women's and children's ribbed underwear, are nearly completed.

New Jersey, Riverside. It is reported that the Henry Taubel & Son Knitting Mill, which has been operating 152 knitters, 13 ribbers and 30 loopers on seamless mercerized hosiery for men and women, has recently installed additional machines on which a line of artificial silk plaited hosiery will be made.

New York, Greenwich. A new bleach house is being built to the plant of Jesse V. Palmer Company; also extensive changes are being made about the plant. The mill is shut down at pres-

ent but J. V. Palmer expects to resume manufacturing about August 1. The mill will be started on ladies' bleached jersey ribbed union suits, also two piece garments.

New York, Greenwich. Twelve new knitting machines are being installed in the plant of the Greenwich Knitting Company, manufacturers of women's and children's cotton ribbed underwear and union suits.

New York, Oswego. The Lastlong Underwear Company is getting out a line of high grade summer underwear. A new Hoffman press was recently installed in the finishing department.

*North Carolina, Burlington. The Whitehead Hosiery Mills, Inc., have begun the construction of the new 3-story mill for which plans were made in March. The new mill will be 160 by 50 ft., 3 stories high. The first floor will contain the offices, storage and shipping rooms, and the other two floors will be equipped for hosiery manufacturing. The present quarters will be discontinued on the completion of the new mill about August 15 when the property will be leased or sold. In connection with the construction of this new mill the equipment is to be increased to 200 knitters, 45 ribbers and 35 loopers. The enlargement represents a cost of $75,000 and an increase has been made in the capital stock from $25,000 to $100,000. R. H. Whitehead is treasurer and buyer.

Ohio, Bowling Green. Plans for further increasing the plant of the Monarch Underwear Company are being worked out. A few weeks ago the capital stock was increased from $10,000 to $50,000 and recent enlargements which have been completed include the building of a new warehouse and the installation of several knitting machines and sewing machines. R. J. Eberly, the president, treasurer and buyer, recently purchased the interest of R. D. Roper, the former manager, and is now active in the direction of manufacturing. E. H. McCreary is superintendent.

Ohio, Mentor. Some new machinery equipment is being installed by the Mentor Knitting Mills Company to make a fine line of men's underwear.

*Ohio, Painesville. About July 1 the Ohio Textile Company will move from the present location on Richmond St. to the larger quarters at 210-14 South State St., recently acquired. Two new knitting machines will be installed at once and it is planned to double the equipment within a short time. This concern manufactures men's union suits and two-piece underwear in cotton, worsted, linen and silk, operating by electric power. The capital stock is $10,000. R. H. Lapham is president, and W. C. Clother, treasurer and buyer. The product is sold direct by mail and is chiefly made to measure for the consumer.

*Ohio, Piqua. All the new machinery which it was reported would be added by the Piqua Hosiery Company has been ordered and all of the new equipment has been installed except five spring needle machines. The capital stock was recently increased from $75,000 to $150,000.

Pennsylvania, Philadelphia. The knitting plant operated by Harry Elwell at 1543 Ruan St., Frankford, on silk and art silk neckties, now contains 15 knitters, which will be increased to 30 machines within the next few months. There is a probability that within a short time a company will be formed and incorporated and a consolidation made of Mr. Elwell's plant and the plant of F. H. Mayhew, 397 Bridge St., Brooklyn, N. Y., and the two plants put under one roof in this city, in which event they will operate about 130 knitters. The production of the Frankford Mill is sold direct from the Brooklyn office of Mr. Mayhew.

Pennsylvania, Philadelphia. It is reported that the Germania Hosiery Mills, Kensington and Allegheny Aves., manufacturers of children's and infants' hosiery, have recently installed a number of knitters on which they are making a line of silk and art silk neckties, which they are selling direct.

Pennsylvania, Philadelphia. Landau & Jacobson, manufacturers of high grade silk neckties, have removed their plant from 10 South 4th St. to the corner of Strawberry and Market Sts., where larger quarters have been secured and equipment enlarged.

Pennsylvania, Philadelphia. A Hoffman press has recently been installed in the plant of the Crossingham Knitting Mills, Inc., for pressing their children's underwear.

Pennsylvania, Schuylkill Haven. A new boiler is being installed in the Thomas Knitting Mills, manufacturers of children's cotton ribbed underwear.

West Virginia, Martinsburg. H. L. Brown, a Philadelphia contractor, is estimating on plans for a new building to be erected for the Interwoven Mills, Inc. The new building will be 4 stories high, 56 by 136 ft.

*Wisconsin, Hartford. Five new machines are being installed in the local plant of the Paramount Knitting Company of Chicago.

*Wisconsin, Merrill. At a meeting of the officers of the Merrill Knitting Company, it was decided to make the new brick mill now under construction three stories high, instead of two, as the original plans called for. Increasing business is responsible for the enlargement of the plans. In March the capital stock was increased to $30,000 and work was started on a brick mill 40 by 75 ft., next to the present quarters. The company manufactures a high grade of sweaters, knit goods, neckties, etc.

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Mills Starting Up.

*North Carolina, Penrose. The Calhoun Hosiery Company, recently incorporated, has organized with J. G. Scrutchin, Jr., president and treasurer; F. P. Bacon, vice-president; and W. L. Talley, secretary. As noted the new company will take over the knitting plant formerly operated by the Penrose Mfg. Company.

SILK.

New Mills.

New Jersey, Paterson. The Gerard Silk Mills have been incorporated with capital stock of $6,000 to manufacture silk ribbons, and will locate at 181 River St., beginning operations about June 20 with seven ribbon looms. Isador Hammer is president, and L. B. Samilow, 229 4th Ave., New York, is treasurer and buyer.

New York, Long Island City. T. C. Nellist, 526 Third Ave., Astoria, is ordering machinery for a new plush and velvet mill in which he is interested.

*New York, Whitestone. The new silk mill will be 1-story high, 150 by 438 ft. Jacob Sulzbach, 68 Wooster St., New York, a silk manufacturer, heads the project.

*Pennsylvania, Berwick. The new silk throwing plant, which it has been reported would be built by Fred Muster, formerly superintendent of the Baer Silk Company, is for the Tamaqua Silk Throwing Mills, Inc., Tamaqua, Pa., which will be reorganized under the name of the Muster Company. The new company will have capital stock of $15,000. Fred Muster will be president, superintendent and buyer, and Ernest Muster, treasurer. Construction work was started April 10 on the mill building and in addition to the equipment now operated at Tamaqua, 2,000 spindles will be added. The Tamaqua Silk Throwing Mills is comparatively a new concern. It was organized by Ernest Muster, who was formerly superintendent of the Helvetia Silk Mill at Lehighton.

*Pennsylvania, Hanover. The new silk mill to be erected for E. & H. Levy, silk ribbon manufacturers of New York, will be located in the East End, facing Ridge Ave., south of East Middle St., on a site purchased by the Merchants' Association. The plans for the building are practically completed. Ernest Levy came to Hanover recently to meet a committee of the Merchants' Association and to look over the site and at that time stated that the construction and equipment of the plant would take about four months.

*Pennsylvania, Northumberland. Builders in Philadelphia are estimating on plans for a 1-story and basement building, 148 by 132 ft., to be used by the Susquehanna Silk Mills as a winding plant. The main mill of the company is located in Sunbury with branch mills at Jersey Shore, Milton and Lewiston, Pa., and Marion, O. They manufacture silk and silk mixed goods.

Pennsylvania, Philadelphia. Frank Minet has recently installed an equipment for the winding and warping of silk yarns for dress goods and ribbon weavers. The plant is located in Wissinoming on Walker St.

*Pennsylvania, Quakertown. The new concern establishing a plant here to be operated under the name of the Maxwell Ribbon Company is said to be an annex of Smith & Kauffmann, ribbon manufacturers with plants at 19 E. 26th St., New York City, and Norwalk, Conn. Machinery from Smith & Kauffmann's plants is being moved here and will be set up in the plant of the new company which is located on West Broad St.

*Pennsylvania, Swoyersville. Contract has been let for the projected new silk mill headed by A. L. Storms of Nanticoke. The plans call for a brick mill, 125 by 50 ft., with outside fireproof vaults, boiler and engine room, etc. It was noted in April that a site on Walnut St., 160 by 130 ft., had been purchased by Mr. Storms and his associates.

Virginia, Front Royal. Schwarzenbach Huber Company, previously reported looking for a location for a branch mill in the South, have secured a building at Front Royal which is now being remodeled preparatory to installing looms. Owing to labor troubles at Union Hill, N. J., it has been decided to close the Franklin St. mill and move the machinery South. The main plant is at West Hoboken, N. J.

Enlargements and Improvements.

Connecticut, South Manchester. Cheney Brothers are tearing down the old wooden dam preparatory to building a new concrete dam for their water storage at Colds Pond.

New York, Binghamton. An addition is being built to the Ballard Silk Company's plant. This is a small concern doing commission weaving and skein dyeing.

Pennsylvania, Bally. It is reported the Imperial Ribbon Company, Inc., of East Greenville, and the Orino Silk Mills of Bally will be consolidated and that a larger plant wil be operated at Bally. Both concerns make silk ribbons, the Orino Mills having 18 looms and the Imperial Company having 20 looms.

*Pennsylvania, Bangor. The Reliance Silk Company of Paterson will be combined with the Pennsylvania Silk Company, which took over the Bangor Silk Company, and the former concern's machinery is to be moved to Bangor on the completion of the new 2-story addition being built to the plant of the Pennsylvania Silk Company. The Pennsylvania Silk Company has at present 90 looms. Seventy looms will be brought here, giving a total of 160 looms to be operated on broad silks. The addition will be 60 by 75 ft. and is to be finished by September 10. Dr. D. H. Kellert is president, and Henry Wilde, treasurer, manager and buyer.

*Pennsylvania, Dushore. The Mason Silk Mills of Paterson have leased the Loyal Sock Silk Company's plant. Two hundred and fifty looms are operated at Paterson and 120 looms of this equipment will be moved to Dushore and installed in an addition which is to be built. A new location will be found for the balance of the equipment now operated in Paterson.

Pennsylvania, Reading. The Reading Glove & Mitten Mfg. Company has moved into its new mill at Gordan and Buttonwood Sts. and the name of the concern has been changed to the Schuylkill Silk Mills. The management is the same as heretofore. Silk gloves, underwear and yard goods are manufactured, and the equipment is being increased in the new quarters.

New Publications

(Any work noticed under this head can be obtained through the office of this journal.)

CORRECTION

Cotton Mill Machinery Calculations; by B. M. Parker.

The price of this book is $1.50 instead of $1.00 as stated in our June issue.

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Cotton, Its Cultivation. History and Sale (Die Baumwolle); by Dr. Hans Heizmann; 344 pages, 6 by 9 1/2; Rascher & Co., Zurich and Leipzig. Price $2.50.

The first part of this book deals with the cultivation of cotton in ancient times. This is followed by material compiled from many sources dealing with the following subjects: The possible increase in the cotton crop; cotton growing conditions in the United States; cultivation of the soil; planting; varieties of cotton; organization and efficiency of the Departments of Agriculture and of Commerce and Labor in the United States; the International Agricultural Institute of Rome; damage to the cotton fiber; the cotton crop; ginning cotton; baling cotton; damp in cotton. The text is in German.

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The New English System of Money, Weights and Measures, and of Arithmetic; by Engineer Rear-Admiral G. Elbrow, Royal Navy; 40 pages, 4 1/2 by 7; P. S. King & Son, London. Price 50 cents.

The author of this book proposes a duodecimal system for money, weights and measures and arithmetic. He adjusts his system so as to leave unchanged as many of the present standards as possible and at the same time give a corelation between the weight and cubic contents of a given quantity of distilled water. One can for the sake of argument concede that Admiral Elbrow has framed the best possible duodecimal system, and yet remain convinced that his plan is hopelessly impossible. The fatal defect in the Elbrow system is that it comes into conflict with the fixed habits, the history and the material accumulations of mankind. The history of money, weights and measures, and arithmetic is filled with plans for the reform of established systems. All but one have failed to find a place in the work of the world. That one, the metric system, secured a lodgment because it was backed by the full force of the French Revolution. After that Revolution had spent its force the world discovered that instead of promoting the unification of weights and measures, the metric system had increased the confusion by increasing the number of established units of weights and measure. As John Quincy Adams said, "Nature has no partiality for the number ten and efforts to shackle her freedom will forever prove abortive." The same thing is true of the number twelve, which Admiral Elbrow has selected for the base of his system. Doubtless twelve is a better base for arithmetical notation than ten, but ten is established. It is now many centuries too late to change this established base. The simplification of our weights and measures must now come by a slow and difficult process of elimination. A radical change is impossible.

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Ancient Egyptian and Greek Looms; by H. Ling Roth, keeper of the Bankfield (Eng.), Museum; 41 pages, 7 1/2 by 11; F. King & Sons, George St., Halifax, Eng. Price $1.

The author of this book, who is the keeper of the Bankfield Museum, has had excellent opportunity to study the looms used by the ancient Egyptians and Greeks. The fact that the Museum is situated in the English textile district led Mr. Roth to collect specimens of the spinning and weaving appliances of ancient times. The author begins with an account of Egyptian looms, dividing this chapter into two parts: the first is devoted to horizontal looms; the second, to the vertical type. Next comes a description of portions of looms which have survived the ravages of time and found a resting place in various museums. The author disputes the claim that the Egyptians wove some of their fabrics with the filling running diagonally across the cloth and believes that this diagonal effect has been caused by winding the cloth over the bodies of the mummies for so long a time as to stretch the warp and filling out of its original position.

The book contains a report on fifteen specimens of mummy wrappings examined by W. W. Midgley, former curator of the Bolton Museum, who tabulates the details of the different fabrics and states in a foot note that it is very obvious that the Egyptian had no scale to work to. It is not so obvious to us as it appears to be to Mr. Midgley. We think he will find as great variation in the construction of fifteen modern fabrics selected at random as he has found in the fifteen Egyptian cloths. The second part of the book is devoted to the upright looms of the Greeks.

The book is freely illustrated and is a valuable contribution to the literature of ancient textiles.

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The Spinning of Worsted Yarn (Filature de la Laine Peignee); by Paul Lamoitier; 476 pages, 6 1/2 by 9 1/2; Dunod and Pinat, 47 Quai des Grands-Augustins, Paris, France.

This work deals exclusively with the French system of worsted spinning. The first part is devoted to mechanical and electrical engineering as applied in worsted spinning. Part 2 deals with the raw wool, giving an account of the fiber structure and the growing and marketing of wool in the various countries of the world. In the third part the author takes up the question of wool sorting. The remaining processes of converting wool into worsted yarn are described under the following heads: Part 4, Combing; Part 5, Worsted Drawing; Part 6, The Worsted Mule; Part 7, The Ring Frame; Part 8, Fancy Yarn. The text is in French.

BUSINESS LITERATURE

Industrial Lighting; The Cooper Hewitt Electric Co., Hoboken, N. J.

This pamphlet is an illustrated account of the theory and practice of artificial illumination in factories and workshops. It makes very clear the economy of well lighted work rooms, beginning with the rudiments of the subject and carrying the report along until the most modern methods of lighting are described. Following are a number of the subjects treated in the pamphlet: How Glare Can be Reduced to a Minimum, Faults of Individual Lighting, Advantage of General Illumination, Importance of Diffusion, Effect of Glare on Vision, High Efficiency of the Cooper Hewitt Lamp. The concluding section is devoted to general description and explanation of terms which the reader will find of great value.

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"Wherever you go the world over, a package of Cling-Surface sits beside the belts" The Cling-Surface Co., Buffalo, N. Y.

This is the title of a 24-page booklet describing and illustrating installations of Cling-Surface treated belts in Germany, England, Scotland, Ireland, Norway, Sweden, France, Spain, Switzerland, Belgium and many more foreign countries. It is a convincing and valuable little booklet that every user of belts should have.

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De Laval Steam Turbines; De Laval Steam Turbine Co., Trenton, N. J.

A 108-page booklet just issued by this company describing and illustrating the De Laval velocity-staged turbine. This turbine has only a single pressure stage, but multiple velocity stages; that is, the steam is expanded completely from initial pressure to terminal pressure in a single set of nozzles, after which it impinges upon a first row of moving buckets and is then deflected to a row of stationary vanes from which it is again directed upon a second row of moving buckets. Copies of this book will be sent free to those interested in the development of steam power.

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Clayton Air Compressors; International Steam Pump Co., 115 Broadway, New York.

An attractive Spanish catalogue describing and illustrating the Clayton air compressors has just been issued by the Clayton Air Compressor Works.

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THE FULTON ATHLETIC & SOCIAL CLUB

The regular monthly meeting of this club was held on June 19th. In the absence of the president, A. D. Lown, superintendent of the Fulton Bag and Cotton Co., presided. August Denk, treasurer of the company and Mr. Johnstone, agent, made addresses. The occasion was enlivened by a number of excellent musical selections.

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CALENDAR

Frank M. Deeny, dealer in cotton and mercerized yarns, 1051 Drexel Bldg., Philadelphia, Pa., has issued a very dainty hand painted calendar, suited for either office or home.

Industrial Notes

NEW YORK OFFICE

Lockwood, Greene & Co., architects and engineers for industrial plants, 60 Federal St., Boston, have removed their New York offices from 320 Fifth Ave. to the Architects' Building, 101 Park Ave. The New York representatives of this concern are Frank A. Wing and John M. Toucey.

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A BIG PAINT ORDER

There has been a keen competition among manufacturers for the paint contracts for two of the largest textile mills at present under construction. These contracts were awarded in June and both went to the United States Gutta Percha Paint Co., manufacturers of "Rice's Mill White". The J. W. Bishop Co., the builders of the Ludlow Manufacturing Associates' new plant at Ludlow, Mass., placed an order for over two carloads of Rice's Mill White and later in the same week T. C. Thompson & Brothers, contractors for the new Dan River Mills at Danville, Va., ordered 90 barrels of Rice's Mill White and Rice's Reinforced Outside Paint for that plant.

The textile mills have, from its very first introduction on the market, been large users of Rice's Mill White, which is so well adapted to their requirements.

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HOSIERY AND UNDERWEAR DEPARTMENT

The H. Lee Mallory Co., who recently established sales rooms at 345 Fifth Ave., corner 34th St., has established a hosiery and underwear department under the management of H. K. Cronkhite, formerly buyer for Taft-Weller Co. They severed connection with J. H. Fithian & Co. in January and removed to the commission house of Fleitmann & Co., 4th Ave. and 26th St.

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SOUTHERN NEW ENGLAND TEXTILE CLUB

The Southern New England Textile Club held its June meeting at the Pomham Club at Narragansett Bay. The Pomham Club is celebrated for its old fashioned Rhode Island clam bakes, which they know how to prepare to perfection. Nearly two hundred and fifty members and guests attended the meeting and thoroughly enjoyed the occasion. Several extemporaneous speeches were made, but the occasion was thoroughly informal and very enjoyable on that account.

The officers for the ensuing year were elected as follows: President, Henry C. Dexter, Pawtucket, R. I.; vice-president, Alexander Makepeace, Fall River, Mass.; secretary-treasurer, Frederic L. Chase, Providence, R. I. Executive Committee: Albert W. Dimick, Providence, R. I.; Charles D. Robinson, Crompton, R. I.; George P Grant, Jr., Fitchburg; George C. Hinckley, Providence, R. I.; Charles M. Holmes, New Bedford; Frederic W. Howe, Providence, R. I.; E. Russell

Richardson, Pawtucket, R. I.; Robert Stewart, Lonsdale; John L. Burton, New Bedford; W. A. Robinson, Woonsocket, R. I.

A rising vote of thanks was given to the retiring president, Mr. Robinson, and President-Elect Henry C. Dexter, in response to many calls, thanked the club for his election in a few appropriate remarks. It was through the courtesy of Herbert W. Rice, President of the U. S. Gutta Percha Paint Co., and member of the Pomham Club, that the outing was held at this enjoyable summer resort. The next meeting will be in September.

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HOFFMAN KNIT GOODS PRESSES

The Campbell Knitting Company of Elmira, N. Y., recently taken over by new interests, have lately been installing some new machinery which includes one of the "Hoff-man" "FFF" knit goods presses. The Union Underwear Company of Piqua, Ohio, recently bought a "Hoff-man" "FFF" knit goods press for their new mill in Greenville, Ohio.

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FIVE YEARS OF SAVINGS BANK LIFE INSURANCE

The law establishing savings bank life insurance was passed in Massachusetts in 1907. It was prophesied then by critics of the proposed system that no savings bank in Massachusetts would ever open an insurance department, but June 22, 1913, will be the fifth anniversary of the opening of the insurance department of the Whitman Savings Bank. In these five years savings bank life insurance has grown steadily until today there are four savings banks with insurance departments, namely: The Whitman Savings Bank of Whitman, the People's Savings Bank of Brockton, the Berkshire County Savings Bank of Pittsfield, and the City Savings Bank of Pittsfield. Fourteen other savings banks are public agencies. More than two hundred agencies have been established in factories, shops and mills for the benefit of the employes. This cooperation of business men has been most helpful. There are now more than 7,700 policies in force with insurance to the amount of nearly $3,000,000. The record of these five years has proved the stability, security and permanency of savings bank life insurance, and made clear that its slogan, "Best Insurance at Lowest Cost," is no idle boast.

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CHANGE OF FIRM

Savannah, Ga., June 21, 1913.

The firm of W. W. Gordon & Company will dissolve by limitation on June 30th, 1913.

The undersigned have formed a co-partnership under the firm name of Gordon & Company and will continue the business of W. W. Gordon & Co., under the firm name of Gordon & Company.

The new firm of Gordon & Company will take over all assets and assume all liabilities of the former firm of W. W. Gordon & Co.

Requesting a continuance of your patronage,

Very respectfully,

Beirne Gordon,
G. A. Gordon,
Estate W. W. Gordon.

HEARD, SMITH & TENNANT

The firm of Edwards, Heard & Smith, formerly Crosby & Gregory, will continue in practice hereafter under the firm name of Heard, Smith & Tennant. The surviving partners, Nathan Heard and Louis C. Smith, have associated with them Frederick A. Tennant, until recently Assistant Commissioner of Patents of the United States, and Maurice B. Landers, recently Examiner in the United States Patent Office, and they will continue the same line of practice as before in all matters relating to United States and foreign patents, trade marks and copyrights, both before the Patent Office and the various Federal and State Courts. They retain the same offices in the Old South Bldg., Boston.

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COMMISSIONS ON SOAP

The offence for which a commercial traveler has been fined £20 at Leicester makes the second conviction within a year or two in the supply of soap for textile purposes. The traveler pressed upon an employe of a Leicester dyeing firm an offer of ten shillings a ton upon soap orders; or (say) 2 1/2 per cent. commission. The workman told his principal, who thereupon ordered a ton of soap, and deducted from the account—"secret commission given to our workman 10s. 6d." A receipt was forwarded without remark; and although the head of the soap firm escaped punishment for want of full proof of guilty knowledge, the active agent was fined the sum named, and all the ordinary and some special costs, as a sign of the Court's displeasure. The defendant regarded the gift as "a little drop of allowance, as we call it in Yorkshire," and further as "quite an open transaction."

The trade in soap and supplies of a similar order is widely believed to be specially afflicted by the secret commission system, and soap manufacturers have raised individual voices against a tyranny of bribes which obstructs the free sale of soap upon its own merits. The two successful prosecutions should at least deter the offering of new bribes broadcast, and ought to encourage manufacturers as a whole to shake themselves free of a debasing and ruinous association. Not all makers or all consumers are implicated in the system of illicit allowances, and those on both sides of the case who hold aloof therefrom are able to do so with advantage, at any rate to their consciences and characters. In the directions most honeycombed by bribery there are employes who contrive to hold themselves unspotted, and with perfect ease. One of long experience in a department of trade notorious for its connection with corruption, reports that he has never been offered material consideration but once, and then only in the mild form of a cigar—and this he waived aside with the good-humored assurance that he "never did take any money" and was too old to begin. Altogether, there is evidence that those who want to avoid bribe-taking have no difficulty in doing so. Those who are contrarily disposed will at least not find things made easier for them by such disclosures as these in the Leicester case.—The Textile Mercury.

THE BAYER COMPANY, INC.

The following notice has been sent to the trade:

Gentlemen: We beg to inform you that from and after this date we will be the distributors in the United States and Canada of the colors and pharmaceutical products manufactured by the Farbenfabriken vorm. Friedr. Bayer & Co., of Leverkusen, Germany.

We also beg to inform you that we have acquired the good will of the Farbenfabriken of Elberfeld Company of New York, and that we will handle the products formerly sold by this company.

We further beg to inform you that we have acquired the factory of the Hudson River Aniline Color Works. We shall operate that plant, and sell its products.

The Bayer Company, Inc.

MOISTURE IN AMERICAN COTTON

The results of systematic investigations carried out at the new Havre Testing-house on samples from over 20,000 bales of cotton, show that the French spinners, who import about a million bales annually, have suffered severely through excessive moisture in the raw material. In the statistical records of the Testing-house the amount of moisture in each consignment of cotton is calculated as so much loss or gain to the spinners, according as it exceeded or fell short of the standard allowance of 8 1/2 per cent. The results for the whole period from Sept. 20, 1912, to Jan. 9, 1913, show a considerable variation in the percentage of moisture found in the different sorts of American cotton. In Texas cotton, which showed the best results, out of 131 testings (10,897 bales) 104 showed a gain (i. e., a moisture percentage below 8 1/2), the average being 0.811 per cent. less than the standard; only 27 showed a loss, averaging 0.753 per cent. more moisture than the standard. In cotton from New Orleans, of 35 testings (3,025 bales) 32 showed losses, averaging 2.112 per cent. excess moisture, and three showed gains averaging 0.562 per cent. Of 16 testings from Alabama (1,221 bales) 15 showed a loss averaging 2.561 per cent., and only one showed a gain of 1.057 per cent. Twenty-two testings from Georgia (1,774 bales) showed losses in every case, the average excess moisture being as high as 2.615 per cent.; and on four testings from Carolina (350 bales) the average excess was 3.354 per cent. There were only four testings of Egyptian cotton (200 bales), and they showed an average excess moisture of 1.052 per cent.—The Manchester Guardian.

The Plymouth Mills, Lawrence, Mass., will add to their power plant equipment a 450 kv-a. generator with 14 k. w. exciter. The unit will be supplied and installed by the General Electric Company.

Pennsylvania, Reinholds. U. S. Hornberger has recently placed an order for a number of new knitting machines to be installed in his Reinhold Knitting Mills. The product of this mill is 84 and 144-needle cotton half hose, the plant containing at present 46 knitters and 6 ribbers.

CONDITIONING HOUSE IN PATERSON, N. J.

In pursuance of its general policy of making conditioning and the accurate testing of textiles as convenient and inexpensive as possible the United States Conditioning & Testing Co. has opened a branch house in Paterson, N. J. The Paterson branch will be devoted for the present to the conditioning, boiling off and testing of thrown silk. Paterson is the greatest silk center in the United States and about 75 per cent. of the silk used by the manufacturers is thrown or dyed there. Quantities of thrown silk are shipped from Pennsylvania, New Jersey, New York and other states to the U. S. Conditioning House in New York for testing and then reshipped to Paterson for dyeing. This involves several days delay and the additional transportation charge from New York to Paterson. Express rates from outside points to Paterson are the same as to New York and in general shipments will reach Paterson at about the same time they would arrive in Jersey City. By the new arrangement silk can be consigned direct to the dyer, care of the United States Conditioning and Testing Co., Paterson, N. J., and can be delivered to the dyer the same day provided shippers forward their orders promptly.

The Paterson branch will be in charge of John K. McWilliam, a textile expert and formerly an instructor in the Bradford-Durfee Textile School, Fall River, Mass. Mr. McWilliam has had a thorough textile training and experience and is well prepared to take charge of the new house.

Temporary quarters have been secured on Ward St., opposite the Erie Station, and the company is prepared to receive thrown silk there. It is expected that arrangements will be made during the summer for the erection of a building especially designed for the work of the new Conditioning House.

THE KISSEL KARS IN POSTAL SERVICE

With three and one-half months of service to their credit, the total replacements necessary in the five Kissel Kars used in the parcel post delivery at Washington, D. C., has been one rear wheel bearing and cup. This record is regarded as very remarkable, in view of the fact that each of these trucks gives eight hours constant service every day, with about 225 stops.

THE NEW RIVERSIDE AND DAN RIVER MILLS

The No. 4 mill and weave shed of the Riverside and Dan River Cotton Mills, Danville, Va., designed by Lockwood, Greene & Co., of Boston, will have an installation of 73,440 spindles and 2,200 looms. The buildings will be equipped with the Carrier system for heating, ventilating and humidifying, by which the mill will be heated to a certain temperature in the winter and cooled in the summer, while the relative humidity will be kept constant throughout the year. It is interesting to note in this connection that even in winter when the temperature outside is zero, it will be necessary in the case of the spinning room to run the apparatus as a cooler on account of heat developed by the power used in that room.

NO DAMAGE DONE

A recent fire scare in the establishment of D. Kaplan & Co., dealers in new woolen clips, 7 Vestry St., New York, gave opportunity for demonstrating the fire drill, which is practised in that establishment.

A piece of burlap on a bale of new clips was accidentally ignited and had burned itself out on reaching the new clips. The smoldering of the bagging, after water from a fire pail had been thrown on it by one of their men, caused an odor to reach the assorting room, where the forewoman immediately ordered the assorting girls to leave and they proceeded in an orderly way down the fire escapes.

There was no loss or damage whatever and business was going on again in half an hour in the same well regulated manner as before.

THE CHINESE PIECE-GOODS TRADE

Consular Report

A striking change in the manner of the Chinese piece-goods trade is noted by Noel, Murray & Co., of Shanghai, who state "that nearly every house now engaged in the business sends home orders for Chinese clients instead of on its own account, as formerly many 'hongs' did." Another great change in the trade of Shanghai is in the increasing extent and importance of the weekly auctions; at these auctions some 35 per cent. of the imports of piece goods were disposed of last year. During the next decade or two we may look for great changes in China. It appears from Noel, Murray & Co.'s report that during the year the Japanese competition in yarn has increased and in piece goods has diminished, and that the Chinese mills are becoming an increasingly important factor in the trade.

A comparison of the exports of cotton piece goods for the past four years from the United Kingdom and the United States to China and Hongkong follows. The British figures are for calendar years, while the American are for fiscal years ended June 30:

	1909	1910	1911	1912
United Kingdom:				
Yards	572,443,000	471,334,200	647,449,700	527,636,800
Value	$35,593,313	$35,383,266	$48,027,011	$39,445,896
United States:				
Yards	121,562,469	93,397,596	78,585,021	101,260,519
Value	$7,057,224	$5,696,010	$5,183,900	$7,192,344

POWER TRANSMISSION

The Dodge Manufacturing Company, New York, has secured an order from the Sauquoit Spinning Company, New Hartford, N. Y., for a split iron sheave, 186 by 31 V grooves, 17-inch bore. The sheave will be made in two parts and bolted together. The estimated weight is 50,000 pounds. The sheave will be fitted with cast iron bushings for a 14-inch shaft now on an old engine. When the new engine is purchased the sheave can be placed on a 17-inch shaft without reboring. The grooves will carry 13.8-inch rope. The sheave will run about 100 r. p. m.

A BIG BALATA BELT

Charles Bond Company, 520 Arch St., Philadelphia, are displaying in their store 119 ft. 6 in. of 50 in. 7-ply "Veelos" Balata belting, which will be made endless and installed in the newly erected plant of the Pearson and Ludascher Lumber Company, at Westmoreland Street Wharf, Philadelphia. This is one of the largest Balata belts ever installed in this country. It was made by the Manheim Mfg. & Belting Co., Manheim, Pa., for whom Charles Bond Company are sole Philadelphia agents.

REMOVAL NOTICE

The Elboeuf Knitting Co., of Utica, N. Y., announce the removal of its office and factory from 60 Jay St., to 846 Columbia St., New York.

SIZING AND FINISHING

The Arabol Mfg. Co., 100 William St., New York, solicit correspondence with manufacturers having difficulty with sizing or finishing, or desiring to make an improvement in this respect. Scientific specialization, long and extended experience, modern facilities in factory and laboratory enable the Arabol Co. to meet any conditions. They are continually adding to the staples that have made them popular with the textile trade.

MANILA ROPE DRIVES

The Dodge Manufacturing Company, New York City, has secured an order from the Sauquoit Spinning Company, New Hartford, N. Y., for two 525 h. p. Dodge-American rope drives from one engine wheel. 4,700 feet of Dodge Firmus Manila transmission rope 1 3/8 inch in diameter will be used on the job. In connection with the rope driving equipment, there will be a lot of forged shafts, compression couplings, automatic self-lubricating bearings, sling hangers, etc.

A NEW DEPARTMENT

Arthur D. Little, Inc., chemists and engineers, 93 Broad St., Boston, Mass., announces the establishment of a forest products department under the direction of Dr. L. F. Hawley, formerly in charge of the section of wood distillation and chemistry of the United States forest service. This department will be fully equipped for efficiency studies, the examination of new processes, or the solution of any problem in connection with turpentine, rosin, or other forest products, wood distillation, or the utilization of wood wastes.

ABSORBENT COTTON AND GAUZE IN ENGLAND

Consul Horace Lee Washington, Liverpool

An inquiry has been received from an American manufacturer of absorbent cotton and gauze asking as to the possibilities for the introduction of his products into the Liverpool district and also as to local producers. Such manufacture is carried on to but a limited extent in this consular district, Manchester and vicinity being the principal center of the industry in England. One grade of 36-inch wadding (sample E) is sold in Liverpool at $0.42 per dozen yards, made up in lengths of 12 yards. Gauze sold at $0.26 per dozen yards (sample C) is put up in 6-yard packets. Gauzes come in 6-yard pieces and in rolls of 100 to 120 yards and are 32 to 36 inches in width, but no definite information is obtainable as to the number of meshes to the square inch, as there are many different qualities, coarse and fine.

Absorbent cotton, unbleached (sample B), sells at the following prices per 144 yards, made up in 4-yard lengths: 1 inch, $1.70; 1 1/2 inch, $2.37; 2 inch, $3.04; 2 1/2 inch, $3.77; 3 inch, $4.38; 3 1/2 inch, $4.86; 4 inch, $5.59. For large quantities the price would be lower. Absorbent cotton wool (sample D) is sold at $0.18 per pound for small quantities. Larger quantities would be quoted somewhat below this. Absorbent cotton, bleached (sample A), sells at the following prices per 144 yards, made up into 6-yard lengths: 1 inch, $1.46; 1 1/2 inch, $2.07; 2 inch, $2.80; 2 1/2 inch, $3.65; 3 inch, $4.14; 3 1/2 inch, $4.62; 4 inch, $5.35. These prices are for small quantities only, and the prices would be lower for large quantities.

The addresses of five Liverpool dealers in bandages, who have been interviewed by a representative of this consulate and who are desirous of entering into correspondence with American manufacturers, and the address of a firm of wadding dealers, who wish to hear from American producers, are on file in the Bureau of Foreign and Domestic Commerce, Washington, D. C., from which bureau may also be obtained the samples referred to above.

THE ARABOL MFG. CO.

Arabol Gum G is one of the staples of The Arabol Mfg. Co., 100 William St., New York. When used in its pure state it gives excellent results in light or heavy sizing of cotton warps and is especially recommended for use in export goods, such as China shirtings, drills, denims, coarse or medium goods, etc. Mixed with starch, it gives more volume and adhesive power, adding at the same time, elasticity and tensile strength.

Cheney Brothers, of South Manchester, Conn., have contracted with the Dodge Mfg. Co., through their Boston office, for a large quantity of Dodge transmission machinery for use in cardroom of their dress goods mill.

*North Carolina, Maysville. It is understood that the project to establish a cotton yarn mill here under the name of the Maysville Cotton Mill Company, which was agitated several months ago, has been dropped.

COTTON GROWING LIMITED IN WEST AFRICA

CONSUL W. J. YERBY, Sierra Leone

During the first three months of 1913 there were 1,982 bales of cotton, or 766,640 pounds, valued at $97,501, exported from Southern Nigeria, West Africa, against 971 bales, or 381,808 pounds, valued at $37,529, during the first three months in 1912. The local price obtained for this cotton ranged from 9 to 13 cents per pound. Though this is an increase over previous years, and the prospects, as stated recently by the president of the British Cotton Growing Association, are that West Africa will produce a crop this year of quite 20,000 bales, the tendency is toward no large production for export from West Africa during the near future, the production per acre being too small, averaging not over 200 pounds. The climatic conditions—the long dry spells and the long wet spells—are against the growth of cotton on a large scale.

There were 33,303,552 pounds of palm oil and 32,729 tons of palm kernels exported from the colony during the first quarter of 1913, a decrease of 7,000,000 pounds of oil and of 4,778 tons of palm kernels as compared with the same period in 1912.

CARD GRINDING MACHINERY

Samuel Sefton, of Dronsfield Brothers, Ltd., Atlas Works, Oldham, England, has been spending some time in the United States, visiting the cotton mills and machinery importers with whom they do a large business in their card grinding machinery, in the manufacture of which they are specialists. Mr. Sefton spends a large part of his time in visiting various foreign countries, for wherever there are cotton mills Dronsfield machinery is in use. The United States is his last stopping place on his recent trip around the world, which has included countries of Europe, India, China and Japan. Dronsfield Brothers, Ltd., are bringing out a new machine, described elsewhere in this issue of the Textile World Record, for grinding and at the same time straightening the wire on lickers-in.

NEW COTTON MILLS

The Postex Cotton Mills Co. and the Post Power Co., of Post, Texas, have just completed new cotton mills, which were built on the "Unit" method of construction for reinforced concrete buildings. These "Unit" blocks are made by the Unit Construction Co., of St. Louis. The Postex Mills comprise the main mill, 521 by 133 feet, 25 feet high; the warehouse, 200 by 102 feet, 17 feet high; the lint cotton bin, 101 by 52 feet, 17 feet high; the bleachery, 222 by 50 feet; bleachery wings, 101 by 50 feet, and the cotton gin, 61 by 25 feet. Cotton taken from the field leaves this mill as finished goods. The power house is 143 feet by 84 feet with spans of 42 feet. The power plant supplies power to this industry and the city of Post.

Massachusetts, Monson. A number of weavers laid off indefinitely a few days ago by A. D. Ellis & Sons have been called in and put to work.

Recent Textile Patents

BOBBIN HANDLING Apparatus. 1,063,588. Burt A. Peterson, Rockford, Ill.

BRAIDING MACHINE. 1,064,407. Simon W. Wardwell, Providence, R. I.

CARDING MACHINE, Dust Remover for. 1,065,179. Herbert Smethurst, Hollinwood, England.

DYEING. 1,064,393. Betrand S. Summers, Port Huron, Mich.

DYEING MACHINE. 1,065,036. John C. Evenden, Amsterdam, N. Y.

HOSIERY, Vertically-striped Seamless. 1,062,910. Emil A. Hirner, Allentown, Pa.

KNITTING MACHINE. 1,063,551. August F. Killian, Palmyra, N. J.

KNITTING MACHINE. 1,063,743. Robert W. Scott, Leeds Point, N. J.

KNITTING MACHINE, Circular. 1,062,875. Josiah Black, Philadelphia, Pa.

KNITTING MACHINE Attachment. 1,064,185. Harry H. West, Plymouth, Pa.

KNITTING MACHINES, Flat. 1,063,453. Josef Kellner, Brooklyn, N. Y.

KNITTING MACHINE Thread Changing Mechanism. 1,062,911. Emil A. Hirner, Allentown, Pa.

KNITTING MACHINES. Quarter-saver for Circular Spring Needle. 1,065,868. Daniel F. Sullivan, Lowell, Mass.

KNITTING MACHINES, Web Take-up Device for. 1,065,215. William H. Childrey, Haw River, N. C.

LOOM ATTACHMENT. 1,063,409. Julius Benz, Bethlehem, Pa.

LOOM SHUTTLE. 1,063,448. Alfred Isherwood, New Bedford, Mass.

LOOM SHUTTLE. 1,064,245. John F. O'Neill, Farnumsville, Mass.

LOOM for Weaving Knotted Fabrics. 1,063,627. Thomas P. Walsh, Worcester, Mass.

LOOM SHUTTLE Tension Device. 1,063,518. Jerome E. Emerson, Lockport, N. Y.

LOOM SHEDDING Mechanism. 1,064,494. Fred Lacey, Lowell, Mass.

LOOMS, Batten Structures for Narrow Ware. 1,063,178. Frederick Benz, Haledon, N. J.

LOOMS, Weft-parter Device for. 1,064,651. Simeon S. Jackson, Boston, Mass.

LOOM, Narrow Ware. 1,057,133. Arthur Emery, Philadelphia, Pa.

LOOM SHEDDING Mechanism. 1,060,830. Albert A. Gordon, Jr., Worcester, Mass.

LOOM for Weaving Fulled Valance Hammocks. 1,057,085. Isaac E. Palmer, Middletown, Conn.

LOOM WARP Stop Motion. 1,061,553. William B. Monk, Keighley, England.

LOOMS, Batten Structure for Narrow Ware. 1,059,972. Frederick Benz, Jr., Haledon, N. J.

LOOMS, Friction Let-off Mechanism for. 1,061,500. Andrew J. Riley, Alabama City, Ala.

LOOMS, Shedding Mechanism for. 1,062,153 Albert A. Gordon, Jr., Worcester, Mass.

LOOM WEFT Replenishing Mechanism, Automatic. 1,060,830. Bernhard Elmendorf and Johannes Gabler, Isselhorst, Germany.

NECKTIES, Making. 1,057,285. William H. Scott, Jr., New York.

PILE FABRIC. 1,057,274. Frank A. Rauner, Ellenville, N. Y.

PILE FABRIC, Woven. 1,064,482. Richard Hirst, Philadelphia, Pa.

SHUTTLE. 1,062,060. William Townsend, Philadelphia, Pa.

SHUTTLE and Picker-stick Check. 1,062,395. David E. Gray, White Plains, N. Y.

SHUTTLE, Hand Threading. 1,062,251. Charles G. Petzold, Providence, R. I.

SHUTTLE THREADING Device. 1,063,133. Cornelius Miller, Providence, R. I.

SPINNING FRAME. 1,064,281. Herbert G. Beede, Pawtucket, R. I.

SPINNING or Twisting Machines, Thread Guide Support for. 1,064,234. Rufus S. Matteson, Providence, R. I.

TWISTING MACHINE. 1,064,280. Herbert G. Beede, Pawtucket, R. I.

WINDING MACHINE. 1,062,930. Claes Ryden and Frank D. Babcock, Providence, R. I.

WINDING MACHINE. 1,063,992. John O. McKean, Westfield, Mass.

WINDING MACHINE, Fabric. 1,064,337. Oscar I. Judelshon, New York.

RECENT TEXTILE TRADE MARKS REGISTERED

68,965. Cotton piece goods. Marks: LLL. Owner: Tremont & Suffolk Mills, Lowell, Mass.

69,656. Sweaters, hosiery and other knit fabrics. Mark: Fashionknit. Owner: Franklin Knitting Mills, New York.

69,822. Yarns of cotton, worsted, woolen, silk, etc. Mark: Dyco. Owner: Dexter Yarn Co., Pawtucket, R. I.

70,506. Cotton and silk goods in the piece. Mark: Joan of Arc. Owner: B. Hart & Bro., San Francisco, Cal.

65,270. Underwear. Mark DMC. Owner: William and Charles Topkis, Wilmington, Del.

67,348. Blankets. Mark: Cortex Blanket. Owner: Esmond Mills, Esmond, R. I.

67,367. Sweaters, hoods, etc. Mark: Emo'cil. Owner: Edward F. Bornemann, Rutherford, N. J.